RAILROAD GAZETTE

SATURDAY, DECEMBER 12, 1874.

Contributions.

The Range of Pressure at which Fixed-Nozzle Injectors will Work.

TO THE EDITOR OF THE RAILROAD GAZETTE:

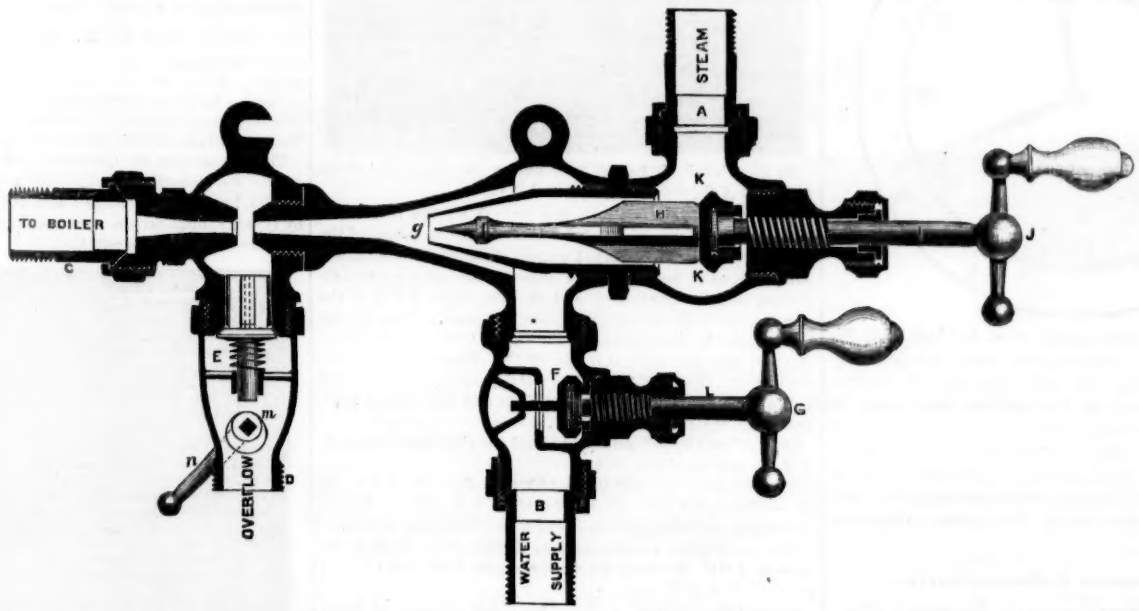
In the "Catechism of the Locomotive" which was recently published in weekly parts in the RAILROAD GAZETTE, some statements were made regarding the working of injectors which, though perhaps quite true of the special forms of that instrument which were selected for the illustrations in the "Catechism," are not true if asserted of all forms of injectors, and we think do injustice to us, as we will attempt to show.

Question 132 and the answer thereto in the "Catechism" are as follows:

"*Will a fixed-nozzle injector, such as has been described, answer as a boiler feeder in locomotives?*" ANSWER: "It will answer at some one pressure to which it may have been adapted in making the instrument, and at that pressure it will work admirably, but it will not work satisfactorily at any other pressure, either higher or lower, and has not much range in quantity of water delivered."

Now, as we have stated, this may be quite true of the form of fixed nozzle injector with which the questions and answers preceding the above were illustrated, but it is not true of Mack's injector, which is the form we manufacture, and of which we will furnish you an engraving to be published with this letter. The inventor of this instrument found, after the most careful investigation and experiment, that its efficiency depended largely upon the form of the fixed nozzle, *g*, and of the opening by which it is surrounded. The sides of these, it will be noticed, are tapered at an angle considerably greater than that of the opening below. These proportions, it was found, produced the best results, so that our injectors will work through a range of 50 lbs. variation of steam pressure, without any adjustment whatsoever. In other words, if started with a steam pressure of 140 lbs., they will work until the pressure falls to 90 lbs. without being touched. So with any other equal range, say from 100 lbs. to 50, or from 50 or 90 up to 100 and 140. This we are prepared to guarantee to any parties to whom we may furnish injectors.

In the answer to Question 138 it is also said that "to keep the instrument in working order, constant use is better than occasional use." While this may be the case with the delicate self-adjusting piston employed for that purpose in the Sellers' injector, it is not a source of trouble with the form represented in the engraving herewith. The self-adjusting piston is a very ingenious device for effecting the purpose for which it is intended, and when the water used is very pure, it works very well. This is, however, very rarely the case, especially in the Western States, where the water employed is very impure, and is very apt to so clog up this self-regulating piston, as to make it absolutely necessary to work the injectors "constantly," in order to prevent the piston from sticking fast, and thus becoming the very reverse of "self-regulating." In Mack's injector, however, there is no part which can become clogged up, and it will therefore work as well after weeks of disuse, as it will with "constant use."



The construction of this form of injector is shown so perfectly in the engraving that very little explanation is required. The nozzle, *g*, is fixed in a conical opening in the case. The steam valve is shown at *K*, which fits in the seat, *H*, and has a spindle, *f*, which fits into the mouth of *g*, by which the flow of steam is regulated through *g*. *F* is the water supply valve, and *E* the overflow valve, which can be closed by an eccentric to the right of *E*, which is operated by a handle, *n*.

As you have uniformly indicated a desire to give a fair hearing and do justice to all parties, we trust you will give us space in your paper for the above, and thus enable us to correct a statement which we believe has already done material injury to our business. NATIONAL TUBE WORKS CO.,

Boston, Mass.

American and Fairlie Engines in Peru.

TO THE EDITOR OF THE RAILROAD GAZETTE:

As your columns have given access to this subject, I crave the favor of a little space in order to put on record a few remarks and facts in support of my communication of the 21st January last, to your English contemporary, *Engineering*, which appears to have produced the letter dated 28th July, 1874, from your correspondent, George D. Gilson, published in your issue of the 3d October.

If we accept G. D. G.'s assurance that Mr. Evans' instructions to him were "to be very careful and not write anything home which is not exact and true concerning the performances of engines," the obvious inference is, that Mr. Evans' agents have rendered reports which have not proved exact or true. However, be that as it may, we are confronted by the following singular circumstances having special reference to the point, viz: Mr. Evans avers on page 11 of his pamphlet "On Railway Gauges, Construction, Machinery, etc., etc., for 1873," that, "The Iquique Railway gets along about as usual in trying to force two trains to pass each other on the same track."

His agent, G. D. G., gives an unqualified denial to this statement!

In the face of this paradox any evidence of mine would be superfluous; indeed, the dignity and interests of truth (which I firmly believe Mr. Evans seeks), if not charity, suggest that the remainder of your correspondent's assertions, whose purport and value are thus strikingly exemplified, should be passed over in silence.

It is but just, however, to those officials of the line who have charge of the records to repeat that the performances of the several engines and their consumption of fuel and water, as detailed in my letter to *Engineering*, were taken from the account books of the railway.

It may not be out of place to state here that when I wrote to *Engineering* I had no connection, nor have I now, since my return to England, any interest in common with Mr. Fairlie.

As it may possibly assist Mr. Evans to the knowledge he desires, I shall be greatly obliged if you will have the kindness to publish, with this, the inclosed letter which has been addressed to me without solicitation on my part or on the part of any one within my knowledge. JOHN CLEMINSON.

LONDON, November 18, 1874.

PATILLOS, June 8, 1874.

Mr. Cleminson, Locomotive Superintendent Iquique Railway:

DEAR SIR: Believing that any information respecting the performance of their duties by the "Fairlie" or the "Rogers" locomotives cannot fail to be interesting to you, I beg leave to offer a few remarks on the subject, firstly wishing you distinctly to understand that I am an entirely disinterested party in the matter, and write this only in the interests of justice, knowing, as I do, that for a *consideration* false certificates have been got up and signed, and further believing that from having had charge of both descriptions of engines, and being a driver of thirteen years' experience, (as my certificates and references from the principal lines of India, Jamaica, Chili, Peru, etc., will prove), my opportunities for observation of their different qualities and imperfections have been exceptionally good, so that I make no apology for offering you a short narrative of my experience on the Patillos & Lagunas narrow-gauge (2 ft. 6 in.) line.

I began by driving the Rogers engine "Leon," No. 3, and, as the interests of my employers demanded, did my utmost to render it successful, and succeeded in taking up to the end of the track a greater load than has been taken up by any other driver before or since on the same engine or its twin brother the "Yoro," No. 4, viz.: eight cars loaded over a five per cent. grade. I was then given the Fairlie engine "Iquique" to drive, which up to that time had been the most unsuccessful one among four of the same class working here, and with it was able *easily* to take up the same load of eight cars with the same description of cargo and with the addition of a coach, the engines working with the same pressure of steam and to the same notch expansively. The water and fuel used were less on the "Iquique" than on the "Leon."

I was agreeably surprised at the ease and speed with which I could take the curves (which on this line are exceptionally sharp), for when on the "Leon" with the utmost caution and at the lowest rate of speed the engine had shifted the rails and sleepers from eight to ten inches, causing me an actual fright; and often have I felt thankful for getting down safe. No such feeling has occurred to me on the "Iquique," for I could run with confidence in the engine curving well and with safety. The "Leon" has two cylinders of fifteen inches diameter and eighteen inches stroke; the wheels are of three feet diameter and are six-coupled. The "Iquique" has fourteen inch cylinders and has also eighteen inch stroke, the wheels are three feet three inches in diameter, showing that the nominal horse-power of the "Leon" is greater than the "Iquique."

I would beg of you to observe that, having voluntarily left this road from having received another appointment, I write this from no pecuniary motives whatever, and I am prepared to substantiate my statements at any future time or place if necessary.

I beg to remain, dear sir, yours very obediently,

J. R. CHAPLIN.

Reform in Figuring Hours in Time-Tables.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Permit me to suggest, for the consideration of that large number of your readers who are interested in all that concerns the running of railroad trains, a much needed reform in the matter of time-cards. My proposition is to do away with the present division of the day into two sections of twelve hours distinguished from each other by the contractions "a. m." and "p. m.," substituting therefor a consecutive numeration of the hours from midnight to midnight. Under this arrangement "1 p. m." would be "13:00," "11:30 p. m." would be "23:30." The intervening minutes between midnight and 1 a. m. should also, I think, be represented by the figures "0:35," etc., (say 35 minutes past midnight), rather than by "24:35." The advantages I claim for the reform suggested may be briefly summed up as follows:

(*a*) Mistakes arising from accidental transpositions of the a. m. and p. m. in printed or manuscript time-tables, or from the omission of those distinctive marks, would be rendered impossible.

(*b*) In calculating the running time of trains from one point to another, it will no longer be necessary to scrutinize the whole column of intervening figures in order to make sure of including the correct number of twelve-hour periods, as a single glance will be sufficient to give the total hours in all runs of ordinary duration.

(*c*) All time cards, and especially working-tables, would thus admit of being condensed into a more compact form. At present the space necessarily occupied between lines by the "a. m." or "p. m.," every time noon or midnight is passed, renders our working time-tables on the great through routes most unwieldy; even a division of say 200 miles of road, with say forty intermediate side tracks and way stations, makes a bulky sheet, anything but handy to carry about. Trainmen and others requiring to have such a time-card always on hand are compelled to fold it into smaller compass to suit their pockets; and after being folded and unfolded a few times there is danger of some of the figures becoming illegible. Anything which will render the time-table more compact is a great desideratum. I claim that by the method proposed *one-third* of the space, in depth, can be economized.

Every railroad man will appreciate the advantage of a reform which will put an end to the ambiguity necessarily characterizing the working time-table in its present form, and at the same time facilitate all calculations in regard to the movement of trains by presenting the whole train service in a more compact yet comprehensive form than has hitherto been possible. If some of our leading roads would adopt this suggestion, so far as their working time-tables are concerned, there can be little doubt that the method would soon find favor with

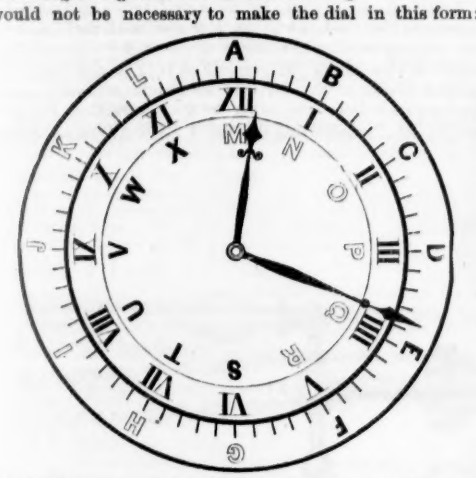
the public and come into general use, instead of the absurd and antiquated custom now in vogue. The only step necessary to educate public sentiment in this respect would be to supplement the ordinary figures on our railroad clocks by inserting a second row of figures under those already in use, thus:

I	II	III	etc.
13	14	15	

C. BARTHOLOMEW.

G. W. R., HAMILTON, Ont., November 23, 1874.

[The above letter gives us an opportunity to produce for a third time our favorite remedy for the evils complained by Mr. Bartholomew, together with some others. In the very first number of the RAILROAD GAZETTE an editorial on uniformity in railroad time (entitled "Time for the Continent") called out a letter from a contributor proposing not only that a uniform standard of railroad time be adopted, but that it be distinguished from local time by numbering (or naming, rather) the hours consecutively as Mr. Bartholomew suggests, and giving the accompanying drawing of a dial-plate for a time-piece indicating both local and railroad time, which we published May 7, 1870, and again with recommendations June 22, 1872. As will be seen, it is proposed to indicate each hour of railroad time by a letter, which would make it impossible to confound it with the minutes. Half-past one in the afternoon would be represented by N 30; half past one in the morning by B 30. The letters in outline are for the twelve hours beginning with six in the morning. Of course it would not be necessary to make the dial in this form:



it might have twenty-four instead of twelve divisions; the essence of the plan is, counting the hours consecutively from one to twenty-four, and indicating them by expressions distinct from those used to indicate local time. If the hours were numbered, even up to twenty-four, it would be possible to mistake railroad for local time up to 13 o'clock; by indicating the hour by a letter there can be no question as to what is meant, and seven forty-five, railroad time, is abbreviated to H 45.—EDITOR RAILROAD GAZETTE.]

Use of the Aneroid in Preliminary Surveys.

PERRY COUNTY, Pa., December 3, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

If aneroid barometers are reliable, it seems to me a great deal of money might be saved to railroad companies, which is expended in preliminary surveys. A great many side lines are generally run, which a few observations with a pair of barometers would often render unnecessary, and then, again, they would be of great assistance in prospecting for a route across a mountainous country.

If some engineer who has had practice with the aneroid barometer on surveys would give the profession the benefit of his experience through the columns of the GAZETTE, I am certain it would be of interest to the guild. J. G.

The Wilson Slide Valve.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your very accurate representation of my valve in your issue of Nov. 14 was to me a pleasant surprise. We have four engines using them, and have run one pair nearly five years. We accomplish what I consider extraordinary results. Enclosed find performance of engine No. 53 for five months, running our Atlantic & Pacific Express between Galesburg and Aurora. We are, I think, using steam expansively to a greater extent than any locomotive in the world (with a slide valve); and as for work done for fuel consumed, I invite competition.

Performance of engine No. 53 on trains 1 and 2, between Aurora and Galesburg. Time on No. 1 about 30 miles per hour; time on No. 2 about 20 miles per hour, including stops. Since June 1 the train has never left on time with No. 2, and has been 5 hours and 37 minutes late:

1874. MONTH.	Engine mileage.	Car mileage.	Whole No. lbs. coal consumed.	Lbs. coal to draw 1 car 1 mile.	Average No. cars per train.
June	3,250	27,290	137,000	5.02	8.39
July	2,000	17,265	82,000	4.75	8.63
August	1,465	11,900	66,000	5.54	8.12
September	3,250	29,005	171,000	5.89	8.92
October	1,250	11,570	58,000	5.01	9 25

Cylinders, 16x24 in.; driving wheel, 61¾ in. diameter; Wil son's valves, 1¼ in. outside lap, ⅛ in. inside lap, 4⅛ in. travel; exhaust nozzles, 3⅛ in. diameter; 2,100 sq. in. grate surface; weight of engine, 34 tons; fuel, Illinois bituminous coal.

Our steepest grade between Aurora and Galesburg is 36 96-100 feet per mile. There are several of this inclination, the longest of which is 3½ miles. I also inclose a statement of trial between Galesburg and Aurora with engines Nos. 53 and 55, the trial ending October 27, 1871. These engines at that time were similar in every respect, excepting valves, No. 53 having a common double exhaust-port valve, balanced, with ⅞ in. outside lap, ⅛ in. inside lap, and 5 in. travel; No. 55 having Wilson's valve, balanced, with a 3⅛ in. travel, 1 in. outside lap, ⅛ in. inside lap.

Result of Trial.

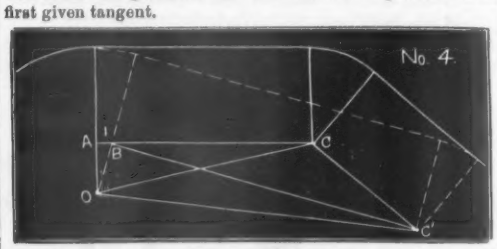
Engine.	Engine mileage.	Car mileage.	Lbs. coal consumed.	Average No. of cars drawn per train.	Lbs. coal consumed to draw one car one mile.	Percentage of saving in coal per work done.
No. 53..	810	6,255	50,169	7 72	8.02	
No. 55..	810	6,030	37,195	7.44	6.16	23.19 per cent. in favor of No. 55

WM. WILSON.

Problem in Location.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the accompanying figure draw $C O$, connecting the centers of the two given curves. Then draw $C A$ parallel to the first given tangent.



In the triangle $O A C$ we have known the angle $O A C$ and the sides $A O$ (= diff. of radii) and $A C$.

Then $O C = \sqrt{O A^2 + A C^2}$, and $O C : O A :: \text{Sin } O A C : \text{Sin } O C A$. By the conditions of the problem the terminus of the second curve is to be moved a given distance. The center C will necessarily be moved the same distance in a parallel direction to C'. Connect C' and O. The angle $A C C'$ is the same as that between the two given tangents. Then in the triangle $O C C'$ we have known the angle $O C C'$ (= $A C C' - A C O$) and the sides $O C$ and $C C'$. Hence $O C + C C' : O C - C C' :: \text{tang. } \frac{1}{2}(C C' O + C O C') : \text{tang. } (C C' O - C O C')$, giving the value of angles $C O C'$ and $C C' O$ and Sin $C O C' : \text{Sin } O C C' :: C C' : O C'$.

On $O C'$ as a hypothenuse construct the right angle triangle $O B C'$, making $O B = O A$.

Then we have $O C' : O B :: \text{Sin } 90° : \text{Sin } B C' O$. $B O C' = 90° - B C O$; Sin $B C' O$: Sin $B O C' :: B O : B C'$. $B C'$ is the length of the required tangent between the two curves.

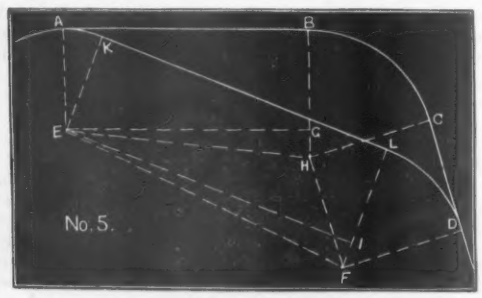
Produce $B C'$ to an intersection, I, with $A C$. Then in the triangle $I C C'$ we have known the angles $I C C'$ and $C C' I$ (= $G C' O - B C' O$).

Hence $180° - (I C C' + C C' I) = C I C'$ = angle of intersection or amount of increase for first curve and decrease for the second.

AMES, Iowa, Nov. 27, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The following is a solution of "D. T.'s" problem in the GAZETTE of November 14:



Let R represent the radius of the first curve = $A E$.
R' that of the second = $B H$.
T the length of the tangent $A B$.
D the distance the P. T. is to be moved = $C D$.

To find the length of the new tangent:

Draw $E G$ parallel to $A B$, then will $E G = T$, $G H = R' - R = F I$, and

$$E H = \sqrt{T^2 + (R' - R)^2} \quad (1)$$

$$\text{Tang. } G E H = \frac{G H}{G E} = \frac{R' - R}{T}, \text{ whence the angle } G E H \text{ is found.}$$

$$\text{The angle } E H F = 180° + G E H - B H C. \quad (2)$$

The angle $B H C$ is known from the transit notes.

Now in the triangle $E H F$ we have the side $E H$ (eq. 1), and the side $H F = D$, and the included angle $E H F$ (eq. 2) from which we find the angle $H E F$ and the side $E F$. Having found $E F$, draw the line $E I$ parallel to $K L$; then will $E I = K L$ = the length of the new tangent =

$$\sqrt{E F^2 - F I^2} = \sqrt{E F^2 - R' - R)^2}. \quad (3)$$

To find the angle $A E K$, from which the length of the curve $A K$ is easily determined, we have the angle $G E H$ determined above, and the angle $H E F$ also determined above. The angle $I E F$ is easily determined, since we have the base and perpendicular of the right-angled triangle $I E F$. Since $A E$ is perpendicular to $E G$ and $K E$ perpendicular to $E I$, the angle $A E K = G E I$.

But $G E I = G E H + H E F - F E I$ $\therefore A E K = G E H + H E F - F E I$ (4).

$$\text{The angle } L F D = B H C - A E K \text{ (5)},$$

from which the length of the second curve is determined.

The above is a solution when $R < R'$ and the P. T. is to be moved forward. If the P. T. is to be moved backward, some of the equations must be changed. The point F falls on the opposite side of $H C$ and the angle $E H F$ is the supplement of that found above. Equation (2) then reduces to $E H F = B H C - G E H$ (6). The angles $G E H$ and $I E F$ change signs; equation (4) becomes $A E K = H E F + I E F - G E H$ (7), and equation (5) becomes $L F D = B H C + A E K$ (8).

If $R > R'$, the points G and I fall on $B H$ and $L F$ produced and the angles $G E H$ and $I E F$ change signs in the above equations.

Collecting and uniting the equations we have for every case that may arise:

$$E H = \sqrt{T^2 + (R' - R)^2} \quad (9)$$

$$E H F = \begin{cases} 180° - B H C \pm G E H \\ \text{or} \\ B H C \mp G E H \end{cases} \quad (10)$$

$$E I = \sqrt{E F^2 - (R' - R)^2} \quad (11)$$

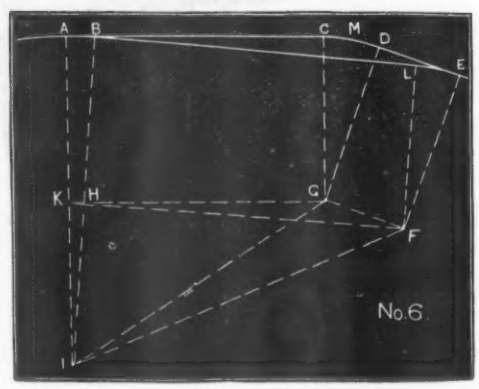
$$A E K = \begin{cases} H E F \pm H E G \mp F E I \\ \text{or} \\ H E F \mp H E G \pm F E I \end{cases} \quad (12)$$

$$L F D = \begin{cases} B H C - A E K \\ \text{or} \\ B H C + A E K \end{cases} \quad (13)$$

The first set of values in eqs. (10), (12) and (13) are to be used when the P. T. is to be moved forward, and the second set when it is to be moved backward. Where double signs occur, the upper ones are to be used when $R < R'$, and the lower ones when $R > R'$. Those terms preceded by a double sign disappear when $R = R'$. When $R > R'$, the second term under the radical in eqs. (9) and (11) should be $(R - R')^2$, but as $(R' - R)^2 = (R - R')^2$, the result is the same and these equations hold true for all cases. A. H. P.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The last solution by 'Farmer," and the one by "D. W. B.," of the more exactly stated problem by "D. T.," give correct results, but they are complex and are unfortunately obscured by typographical errors. I think the following solution would be more convenient in practice.



The figure is drawn to a scale of 1,000 feet to an inch, illustrating "D. T.'s" numerical problem.

Suppose $A C D E$ to be the located line with radii $A I$ and $C G$, M the intersection of the produced tangents and $A B L E$ the altered location.

Let $A C = T$, $A I = R$, $C G = L F = R_1$, and angle $C G D = a$; it is required to find the angles $A I B = b$, $L F E = c$ and the new tangent $B L = T_1$.

SOLUTION.

Draw $G K$ parallel to $C A$ and $F H$ parallel to $B L$. Join $G F$, $G I$ and $F I$.

(1) $I G^2 = I K^2 + K G^2$ $\therefore I G = \sqrt{T^2 + (R - R_1)^2}$.

(2) Tang. $K G I = \frac{I K}{K G} = \frac{R - R_1}{T}$

(3) The angle $K G F = A M E = 180° - a$; the angle $I G F = K G F - K G I = 180° - a - K G I$; hence in the triangle $I G F$ we have the two sides $I G$, $G F$ and their included angle, whence we may compute the other side $I F$ and the angle $G F I$.

(4) Sin $H F I = \frac{I H}{I F} = \frac{R - R_1}{I F}$

(5) Since $E F G$ and $L F H$ are equal, being right angles, $E F I = G F H = G F I - H F I$, and since the total deflection of the new line is equal to that of the old, $A I B = C G D - L F E$.

(6) In the right-angled triangle $I H F$ we have $H F = B L = \sqrt{I F^2 - F H^2}$.

In the numerically stated problem by "D. T.," we find by the above method:

$I G = 2{,}489$ ft., $K G I = 43° 41'$, $I G F = 121° 19'$, $G F I = 53° 08'$, $K G I = 43° 41'$, $G F H =$ angle $c = 12° 50'$, giving arc 256.6 ft., $b = 2° 10'$, giving arc 108 3 ft., and $T_1 = 2{,}027.3$, showing that the new location is 7.8 feet shorter than the old.

H. F. WALLING, C. E.

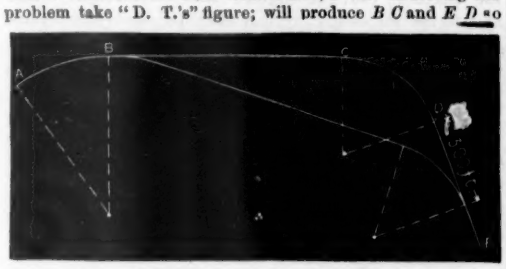
BOSTON, Dec. 2, 1874.

LOUISVILLE, Ky., November 27, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In "D. T.'s letter to your paper of the 14th inst., contain-

ing *new* problem, his criticisms with regard to "W. W. H." are very just, as also with regard to "Farmer;" and yet he is not quite perspicuous himself when he says in one place, "consisting of *the two*-degree curve," and afterwards, "the required tangent point in *the three*-degree curve," unless he meant to compound the curve. By compounding the curve he would make it no more intricate, from the fact that the curve *A B* could have just as well been a continuation of the tangent *B C*, as it does not enter into the problem at all. Knowing that it costs you something to prepare wood cuts, and that it would cost me some trouble also, I will in solving the problem take "D. T.'s" figure; will produce *B C* and *E D* so



as to make an intersection point, *F;* will call the tangent point in the required line at end of three-degree curve *G*, and tangent point in required line at commencement of five-degree curve *H*. The center of the three-degree curve we will call *I*, and of the five-degree curve *K*. I would then draw the line *B E*. Knowing the line *B F* to be $1,800+150^s=1,950^s$, and *E F* to be $300+150^s=450^s$, the contained angle to be 165 degrees, we readily get length of *B E*. I would next produce the radii *E K* and *B I* to an intersection, *L*, making the angle at *L* 15 degrees. It is easy to be seen now that we can get the length of sides formed by the continued radii of the three and five-degree curves to their intersection. Next draw *I K*. Having substracted radii in each case, from *E L* and *B L* (two sides and contained angle given), we get length *I K*. Then from *K* draw *K P* parallel to new tangent, *P* being in radius of smaller circle. The triangle *I P K* is a right-angled triangle, with right-angle at *P;* side *I K* was found previously, and side *I P* is difference between the two radii, viz., 1,910—1,146=764 feet. The side *P K* would then be length of new tangent. Then substracting whole angle *P I L* from 180 degrees gives us angle of three-degree curve. In same manner we find angle of five-degree curve. I am aware to understand my solution one would have to take "D. T.'s" original figure and add to it as I have designated above. Those who care enough for it will probably do so. I am aware also that I have given no formula, but the solution hardly admits of one that would shorten above. G. C. B.

Criticism of Solution of Problem in Location.

FARMWELL, Loudoun Co., Va., Dec. 2, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Fearing that the solution (?) by Mr. Thos. M. Hooper, contained in your last number, may escape the notice which it deserves, I desire to call attention to it. It will hardly be necessary to add that it is a series of shocking blunders from beginning to end. He makes three angles of the same triangle to exceed 180°, and some of his numerical results are more than 100 feet wrong, as a glance at the data will show.

"D. W. B." seems to have known what he was driving at in the beginning, but the latter part of his work is decidedly foggy. He says his solution is "not formulated." Is it, or is it not? I confess it appears to me very badly mixed. "D. W. B." made a mistake. He should have criticised "Farmer," as several others have done, without exposing himself by attempting a solution of the problem. FARMER.

Friction of Car-Journals.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Passing silently over the personalties indulged in by your correspondent "P." in his answer to my remarks in No. 46, as unworthy of a scientific discussion, I fail to see that his deductions from my remarks are justified. The total resistance of a train to traction is a resultant of so many components, in which the load of the cars and their speed play an important part (for instance the resistance on curves or on grades, etc.), that the results arrived at in the experiments quoted by me may surprise, but nevertheless be reliable. As these, and in fact all experiments on car-journals, differ widely from those of stationary journals, it does not seem improper to attribute the difference to the interposition of springs between the journals and the load. When in motion these springs are subject to a series of successive vibrations thereby increasing and decreasing alternately the pressure on the car-journal. Moreover a theoretical investigation of the action of car springs (which I am preparing now) tends to show that an increase in the load of the car does not produce a proportional increase of pressure on the car-journal, but the latter increases by a constant varying for different springs only with the degree of their flexibility. DR.

CHICAGO, Dec. 1, 1874.

Lewis' Improved Railroad Frog.

This frog, represented by the engraving herewith, is manufactured by the Wharton Railroad Switch Company, of Philadelphia, and is thus described by the manufacturers:

"The wrought-iron clamps, *B, B, B*, six inches wide and ⅞ inch thick, extend underneath the frog, and are bent upward outside, so that when the wrought-iron wedges, *C, C, C*, are driven into position, the several pieces forming the frog are most securely held in place. The wrought-iron distance pieces, *D, D, D*, keep the proper openings for the flanges to pass through, and the vertical bolts through them add to the general strength of the frog; but the chief strength is given by means of the wedges in connection with the clamps. The wedges cannot back out by reason of the retaining bolts *E, E*, which pass through them and through the clamps. This arrangement is very simple and strong in all its details, and it has the further advantage of allowing any part of the frog to be easily taken out, without removing the frog from the track. The ties are placed between the clamps, where the rails rest evenly upon them, and the frog can be spiked to the ties both inside and outside, which is very desirable.

"The curve of the side rails (which belongs exclusively to the Lewis patent) allows the easy passage of the wheel flanges through the frog without striking against them, thus avoiding any shock to the wheels, or cutting away the frog, at the angle of intersection. The form of the side rails has been in use upon many leading railroads for years, as the advantages it gives, both in smoothness of passage and in reducing wear of the frogs and wheels, were recognized very soon after Mr. Lewis patented his invention.

"Bessemer steel rails are now used by us for this frog, as they have been found to give the best result in wear, and provide elasticity for the rolling stock. The only objection to their use for frogs generally has hitherto been that there was no suitable method of retaining the several rails firmly in their places. This is entirely overcome by the patent of E. H. Johnston, September 29, 1874."

This frog, as shown in the sketch, is made of Bessemer steel

LEWIS' IMPROVED RAILROAD FROG.

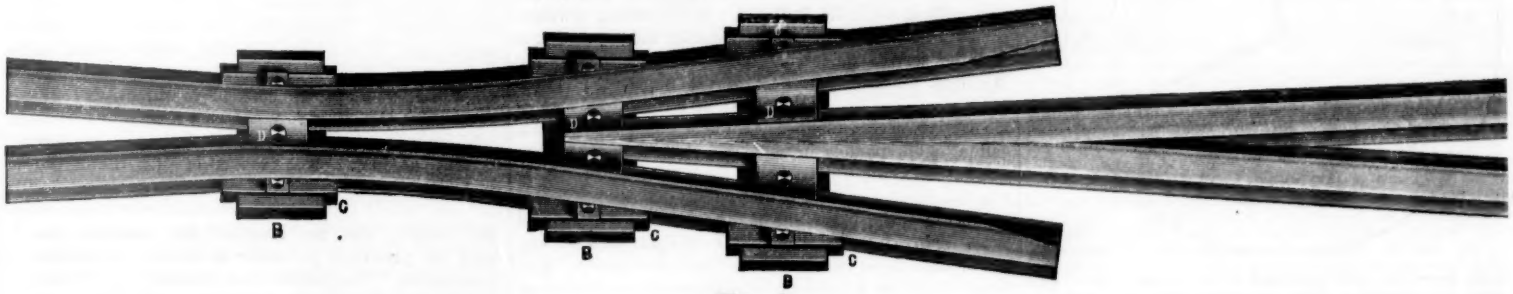


Fig. 1.

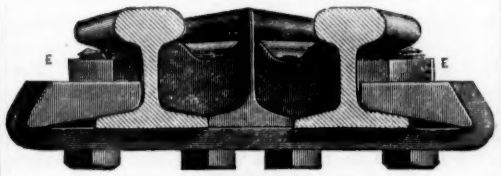


Fig 2.

rails, and as the portion of the rails needed to make the proper fit is planed away, it is not necessary at any time to put the rails in a blacksmith's fire or furnace. The steel therefore retains its original character, and is not softened or deteriorated by any heating or fuzing such as is usually done to effect the same purpose.

These frogs are also made longer than the usual lengths allowed,* which is regarded as an advantage.

The office of the manufacturers is No. 28 South Third street, and the works at the corner of Twenty-third street and Washington avenue, Philadelphia.

Criminal Responsibility for Negligence.

The *Central Law Journal* of November 20 says:

We find the following observations in our able contemporary, the RAILROAD GAZETTE:

"Punishment for neglect is provided for in the French railroad laws, as well as for malicious causing of accidents, and even for threatening to cause one. Article 19 of the law on railroad police of July 15, 1845, says: 'Whoever, through lack of skill, imprudence, inattention, negligence, or disobedience of the laws and regulations, shall have involuntarily caused on a railroad, or in the stations, an accident which shall have occasioned wounds, shall be punished with imprisonment for from eight days to six months, and with a fine of from fifty to a thousand francs. If the accident has caused the death of one or several persons, the imprisonment shall be from six months to five years, and the fine from three hundred to a thousand francs. Article 20 of the same law says: 'Every engineman or brakeman who shall have abandoned his post during the running of a train, shall be punished with imprisonment from six months to two years." This is worse than dismissal, which some trainmen think very hard. The first article provides a punishment which seems impossible in this country under existing laws. It will be remembered that the conductor and engineman of the coal train on the Chicago & Alton Railroad who by running contrary to orders caused the terrible Lemont collision, killing about twenty persons and wounding as many more, could not be punished. The conductor was indicted for manslaughter, but, having been out on bail for nearly a year, on coming to trial was found 'not guilty,' there being of course no shadow of suspicion that he had intended any harm by the act which put his own life in extreme danger. This is a case of which many will feel justified in saying: 'They do these things better in France.'"

The above writer is entirely mistaken when he supposes that drivers of railway trains can negligently kill passengers or co-employes and that "punishment is impossible under existing laws." The law is very old, very well settled, and very familiar to every lawyer, that if one person kills another through negligence in the prosecution of any lawful employment, it is either murder or manslaughter, according to the degree of the negligence involved. Foster Cr. Law, 262-3; 1 Hall P. C., 472-6; 1 East P. C., 262-4; 4 Bla. Com. 192; 2 Whart. Cr. L. 7th Ed., §§ 1,002 *et. seq.* These principles have been applied to railroad accidents produced by negligence in several cases, American and English. 2 Whart. Cr. Law, § 1010 *a*. We do not mention this as a matter of news or even of interest to lawyers, but because it would be a public misfortune if the impression should get out among the drivers of railway trains that they can kill passengers or co-employees through the negligent running of their trains, and yet escape punishment. If the conductor and engineman of the coal train which caused the Lemont disaster were guilty, and yet went unpunished, it was not the fault of the law, but of the manner in which it was administered. There is doubtless need of legislation in some states, making those guilty of negligence or impropriety in running railway trains amenable to punishment where persons are *injured* through such negligence, but not killed; but when death has resulted, the law is good enough if it is only administered.

We did not mean to convey the impression that the law imposed no responsibility for negligence in this country, and we did not say that "punishment is impossible under existing laws," but "punishment *seems* impossible under existing laws"—which is quite a different thing. The fact seems to be that under existing circumstances punishment is scarcely ever inflicted for negligence on the part of railroad men which causes death or injury, and the effect is that the laws have little or no restraining power. So true is this that we know at least one case where, the gross and perfectly clear neglect of orders of a telegraph operator and trainmen having resulted in several deaths, the officers of the road sought to have the guilty parties indicted, but were so sure that punishment could not or would not be inflicted that they did not attempt it and contented themselves with dismissing the offenders. It is quite true, however, that this may not be the fault of the law, common or statute, though the definite mention of the special offences and their penalties in the French law should, it seems probable, have a good effect, both in deterring from the offences and securing convictions on trial. Still a law which is never enforced, be it ever so definite and severe, will soon be forgotten.

Lake and Canal Freights during the Season of 1874.

The Buffalo *Commercial Advertiser* says:

There is a great deal of talk, now-a-days, about cheap transportation, but if property is ever transported from the interior to the seaboard at much lower rates than have prevailed this season it must be after some great improvement on railways and steam-vessels has been adopted. Never in the history of this country have the products of the earth been moved forward for so small an amount of money. * *

The following table shows the average freights on wheat and corn, by lake and canal, for the month of November in the years named:

	LAKE.		CANAL.	
Year.	Wheat. Cents.	Corn. Cents.	Wheat. Cents.	Corn. Cents.
1861	16.0	14.7	25.6	23.5
1862	15.3	14.2	19.6	17.3
1863	9.0	7.7	19.6	17.6
1864	13.7	12.7	18.9	16.4
1865	12.3	11.5	23.1	20.3
1866	13.5	11.7	19.6	16.3
1867	9.0	7.0	19.1	16.3
1868	9.3	8.3	19.2	16.2
1869	10.3	9.8	21.7	19.0
1870	8.5	7.6	11.9	11.5
1871	10.1	9.7	15.9	14.1
1872	12.4	11.4	16.0	14.0
1873	7.4	6.9	12.3	10.6
1874	4.6	4.2	9.7	8.7

For dullness the season of 1874 is without a parallel in the history of our lake and canal commerce. There have been times in which freights touched as low figures as they have in any month this year. For example, about eighteen years ago oats were shipped from Chicago to Buffalo at 1⅛ cents a bushel, but the same vessel that received this ruinous rate brought down a load of corn in the fall on a 29-cent freight. In nearly every dull year there have been periods either in the spring or fall when good freights were paid, and vessel owners were able to cover their losses and have a little surplus left. But during the season of 1874 there has not been an encouraging spurt from the beginning to the end.

The following exhibit, showing the average freight rates on wheat from Chicago to Buffalo by lake, and from Buffalo to New York by canal, and the average from Chicago to New York for the last fourteen seasons proves that freight charges have ruled lower in 1874 than ever before:

Year.	Average by lake. Cents.	Average canal. Cents.	Average lake and canal. Cents.
1861	11.0	15.7	26.7
1862	10.5	14.4	24.9
1863	7.5	15.3	22 8
1864	9.5	18.7	28.2
1865	9.7	16 8	26.5
1866	13.4	16.9	30.3
1867	6.8	15.6	22.4
1868	7.1	15.6	22.7
1869	6.6	16.2	22.8
1870	6.2	11.2	17.4
1871	7.8	12.6	20.4
1872	11.1	13.0	24.1
1873	7.8	11.4	19.2
1874	3.9	10.0	13.9

The average rate from Chicago to New York by water this year is 5.3 cents lower than that of last year, and 3.5 cents under the lowest previous average. It is safe to say that carriers have received less for moving forward the cereal crop this season than it has cost them to do the work.

* A portion of the engraving above has been cut off in order to get it within the limits of our columns.

RAILROAD GAZETTE

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Editorial Announcements.

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE ECONOMY OF KNOWING WHY.

We have before us a copy of our very excellent contemporary, the *Engineering and Mining Journal*, which contains an editorial on "Knowledge and Skill in the Iron Business," the title of which has suggested that which we have adopted for this. The subject of the article first referred to is introduced with the following sentence: "When Mr. Bell stated recently, in his remarks to the mining engineers at their Hazleton meeting, that he thinks we are not using fuel with the utmost economy, and suggested that, with such ores and such coal as we have, we should either reduce the consumption of the latter or '*know the reason why*,' he struck the very key-note of intelligent progress." If Mr. Bell or any one else should say very much the same thing of American locomotives and of nearly all the departments of railroad engineering, he would be disturbing key notes, and probably be making other noises which might not be agreeable music to all engaged in such occupations. There is anxious enquiry now all over the land to learn *the reason why* railroads do not pay, and as the business of transportation has not yet been formulated with sufficient accuracy to enable any of us to tell exactly "where the money goes," it is hard to "know the reason why" they are not profitable. The kind of information which is now needed more than anything else, to enable us to formulate the business of transportation into a science, is more detailed and reliably accurate information of the cost of operating and maintaining railroads. It is work, too, which many persons have abundant opportunity of doing and which requires no other qualification than simply the ability to do careful clerical work.

We have before us annual reports of the following roads: the Lake Shore & Michigan Southern, the Michigan Central, the Chicago, Burlington & Quincy, the Burlington & Missouri River, the Terre Haute & Indianapolis and the Louisville & Nashville. The report of the last named road is by far the most carefully and elaborately prepared published record of the working of any road in this country, and from it a better idea can be gained of "where the money goes" than from any other similar publication. From the report, which is for 1871–1872, we learn that the total cost of transportation per train mile was $1.406591. Of this $0.345528, or about 24½ per cent. was expended by the road department, $0.501938 or about 35¾ per cent., by the machinery department; $0.473414, or 33¾ per cent., by the transportation department, and $0.085711, or about 6 per cent., in main office expenses. It will thus be seen that over 60 per cent. of the total expenses of operating this road is expended in the engineering and mechanical departments. From the Lake Shore report for 1873 we find there was an expenditure in the motive power department, including the consumption of fuel for all purposes apparently, of $3,417,624.99. Turning now to the report of the locomotive department, we find that the only account of this expenditure is given in three items alone, viz: "cost of repairs of engines, cost of enginemen and firemen, cost of fuel consumed." In the car department there was an expenditure of $1,070,049.12, of which there is no account whatsoever excepting the bare statement that so much money was expended for "repairs of cars." The account of the receipts for freight and passengers occupies 19½ closely printed pages of tables showing in the most elaborate manner the total amounts carried, with comparison with the preceding years, the proportion of articles of 13 different classes carried, the amount of freight forwarded and received at each station, a descriptive statement of the different kinds of freight forwarded from each station, a statement showing the direction and relative amounts and rate per ton of freight carried, from January 1, 1870, a general summary of passenger business and the number of passengers leaving each station. We have selected the Lake Shore report for these comments because its statements of traffic are given more in detail, and those of expenses less so than those of any of the other reports before us. What we want to call attention to is the minuteness with which the one is detailed, and the very slight amount of information which is given by the other class of transactions. The same remarks will apply to all the other reports before us excepting that of the Louisville & Nashville Railroad. In the others, however, somewhat more information is given of the expenditures and the service rendered. Thus in the report of the Michigan Central the report of the Superintendent of Machinery gives the cost of repair of locomotives, cost of locomotive-service, number of cords of wood, tons of coal, gallons of oil, pounds of rags and waste consumed, the price of the same; a statement of the cost of each per mile run, the number of men employed in the machinery department on the main line and branches, a statement of miles run by passenger and freight locomotives, the average miles run per day by each locomotive. The report of the car department gives the amount expended on passenger car, baggage car, freight car and hand car repair account. For details of expenses readers of the report are referred to separate statements. The one detailing the expenditure on freight cars begins by saying: "Among the larger items of expenditure are the following." The amount charged to this account is $465,638.68, and the "larger items accounted for" amount to $75,723, leaving $389,915.68 which to some extent must be made up of *smaller items*. Like the man who enquired how another lost his leg and was told that it was "bit off," so a reader of this report must have a very great desire to ask what it was that bit off the odd $389,915.18 not accounted for. Now we want to disclaim in the strongest way any intention of questioning the manner in which that money has been expended. Our only purpose in calling attention to it is because it is this method of reporting railroad operations which makes it impossible to reduce "the business of transportation to a science." The reports of the Chicago, Burlington & Quincy and the Burlington & Missouri River roads both give similar information about the details of expenditure in the locomotive departments, but none whatsoever of the car departments. In strong contrast with these is the report of the Superintendent of Motive Power and Machinery of the Terre Haute & Indianapolis Railroad. The character of this report is indicated by its preface, which is as follows:

"The following report of the operations of the Motive Power and Machinery Department for the fiscal year ending Nov. 30, 1873, with the annual *balance sheets*, showing the *distribution of expenditures*, is herewith respectfully submitted."

The above italics are ours. Following this introduction a table of the mileage of passenger freight and what are called "work" engines is given. Another table gives the cost of running an engine 100 miles in the following items: "repairs of engines; cost of stores; cost of fuel; wages of engineers, firemen and cleaners; and proportion of maintenance of shops." The latter item is one which we have never seen given in any other report, and is a charge which should be made to locomotive and car service on all roads. The mileage of engines in each service to a cord of wood, ton of coal and pint of oil, the cost of fuel for 100 miles run, and the total amount used and the actual cost, and not, as our friend "Hindoo" would say, the *pro-rata* cost, of coal and wood are given. The especially commendable feature of the report is the "balance sheet" in which this department is debited with the amount of material in hand at the end of the previous year, the amount purchased during the year, and the amount of the pay-rolls for the year. The department is thus charged under each of the following heads with the succeeding items:

CONDUCTING TRANSPORTATION.

Cleaning and inspecting cars; fuel and lights for cars; oil, waste and tallow for cars; repairs and supplies to depots; repairs and supplies to telegraph.

MAINTENANCE OF CARS.

Repairs of cars (passenger and freight); tools and repairs of tools; expense of car shops.

MOTIVE POWER.

Repairs of locomotives; engineers and firemen; cleaning engines; coal for engines; stores for engine; fuel and lights for shops; repairs of shops; tools and repairs of; watchmen; clerk hire; superintendence; repairs and expenses of water stations: pumping water; printing and stationery.

MAINTENANCE OF WAY.

Repairs of bridges; chains; frogs; hand-cars; oil, waste and tallow; switches; tools and repairs; watch-houses; repairs of track.

SUNDRY ACCOUNTS.

Foreign work and sale of material; general offices; stock yards.

CONSTRUCTION AND EQUIPMENT.

New baggage car; new express car; new caboose car; new coal dump car; new crane car; new engine house, Terre Haute; new shop at Indianapolis; new coal dumps at Indianapolis; new watch houses, Ninth street; new watch houses, Fourteenth street; new well at Terre Haute; new tools and machinery; new elevator, machine shop, Terre Haute; new elevator, boiler shop, Terre Haute; new turn-table, carpenter shop, Terre Haute; new pile driver, new bridge at Birch Creek; material to S. & D.

A credit is then given of materials on hand, which balances the account. Any business man looking at this account will see at a glance that it is a clear and complete statement of the business of the machinery department for the year, and in that respect quite different from that before referred to. The account is in fact made out, and no doubt kept, in a strictly scientific method—that is, the expenses are distinctly classified, and each item of cost has a place where it belongs and to which it is charged; so that if it is desired to know what it costs to warm and light cars or to clean engines, it can be known by referring to that account. The report of the Louisville & Nashville Railroad is kept in still greater detail, and we mention them not because we think they are perfect, but to indicate the method which must be preserved in order to reduce transportation to a science. We believe that it would be profitable to keep the accounts in even much greater detail than either of the reports last mentioned show. If they were so kept they would even then be very much less complicated than the accounts of any large mercantile firm or manufacturing company. If this exactness is desirable and profitable in private firms and companies, what business man will say it is less so in the more complicated and extensive transactions of a railroad company. When, for example, the fuel consumed costs a railroad company over a million and a half dollars annually, it would seem to be only ordinary business foresight to know how, when and where it is consumed. So of locomotive repairs. It would seem to be very desirable to know what proportion of the three-quarters of a million dollars, which such repairs cost the Lake Shore Company last year, was expended on the boilers, the running-gear, the engines—that is the cylinders, valve-gear and their connections—and on the tenders. What does it cost to maintain head-lights, cow-catchers, etc.? Now it is by knowing what each of these expenses amount to that we are able to analyze them, to tell whether they are too much or too little. It is true, to put accounts in that way would involve some trouble, cost and time, but the same thing might be asserted of the accounts of any private business. The books in which are recorded the business transactions of the RAILROAD GAZETTE (which, we have very excellent reasons for knowing, represent very insignificant amounts compared with the expenditures of any one of the departments of most railroads) are, we believe, kept in more detail, with greater care and accuracy, and the annual reports of its business represent its transactions with very much greater exactness than the managers of nine-tenths of the railroads in the country think it necessary to give their directors and stock-holders in their annual reports, to inform them of the nature of the business done during the preceding year.

The first step towards any reform is to know the extent of the evil. How is it possible to tell whether the expense of car repairs is too much or too little if it is not known how much they are? and were the fact not so well known, it should excite boundless astonishment that probably not one half of the railroad companies in the country know what becomes of the fuel they use and pay for.

We have referred to this subject simply to attract attention to it. What is wanted is patient, careful and intelligent investigation of the cost of transportation by railroad. To understand it thoroughly we must descend to minute details, and thus ferret out and know exactly "where the money goes" and "the reason why."

THE TRANSPORTATION CONVENTION.

The importance of cheap transportation is certainly great enough to justify the existence of a society to study the subject and advocate improvements. But in such an organization it is difficult to establish any qualifications for membership, at least any sufficient qualifications, so that those who join it and take an active part in its proceedings are apt to be those who for any reason whatever have projects which they wish to bring before the public. The actual result with the society known as the "Cheap Transportation Association" seems to have been to attract to its annual conventions a large number of men who have enormous jobs to advocate, for which they wish the government to pay, and in the prosecution of which great fortunes would be made; a second class of wild schemers who have hobbies to exhibit, and who for the most part seem to get a great deal if not full satisfaction from the mere exhibition of their hobbies—a class known in nearly all societies, scientific and other; and finally a certain number of men who are really anxious to secure cheap transportation, some of whom know that to do this they must get the facts concerning the question, and that to get the facts requires a vast deal of plodding work and not a little hard thinking by trained minds. Now when an organization has a considerable proportion of the first two elements, it is hardly likely to do much useful work. The third class are apt to be careful in their statements and conclusions, and not to say a great deal; the second have unbounded confidence in themselves and will talk as often and as long as they can get a chance; while the first are unscrupulous, brazen, energetic and persevering, understand and use the arts of the caucus, and are pretty sure to carry their schemes, unless they happen to stand in the way of other schemes supported by more active and shrewder men of the same class.

The recent convention of the Cheap Transportation Association began in Richmond on the first of this month and continued for four days—days apparently pretty well filled up by reports from committees, speeches of members, and discussions; but, so far as the reports published in the newspapers indicate, it developed no new facts theories or arguments; the complaints made were old complaints, not fortified with proofs; the schemes presented were the old schemes, generally crude, undigested, and utterly unadapted to the requirements of the case; and the facts presented—there were none, at least none of the controlling facts, those on which the successful solution of the problem depends. Indeed, the men who really study the transportation question for the most part stay away from the convention, where they would probably be overridden by the blatherskites and schemers.

It is, indeed, hardly possible that national discussions of plans for cheaper transportation should be free from selfish motives. The essence of the problem is to make the easiest possible path between the producer and the consumer, without reference to the interests of any particular city, State, or route, or class of exchangers. But to one very large class of men cheap transportation has no interest, except as it concerns a plan for diverting traffic from existing routes and cities to St. Louis and New Orleans, to Savannah, to Richmond, to Montreal, or the other city in which they live or own property. Probably more than half of the men who urged the expenditure of two or three hundred millions by the United States for canals here and there and freight railroads would not feel a particle of interest in an improvement which would make it possible to take grain or cotton on the farm where raised and drop it in Manchester, or other place of consumption, at a cost of a cent a hundred and without the expenditure of a cent on the way in any city, seaboard or interior, or on any route, railroad or canal. They are not interested primarily in the elimination of the expenses of exchanges; they only want such an arrangement as will favor the making of the exchanges through their own cities, or, indeed, they only want to secure a great expenditure of money on some national work, which will bring them business and profit as the great war expenditures brought business and profit to so many, in which case they are interested only in schemes which will cost a great deal of money, and would be disgusted with the invention of an air ship which would need no expenditure on its road. This is, of course, unavoidable. The merchants of New York—at least the produce merchants—cannot well help feeling more interest in a plan which will make it cheapest to export grain by way of New York than in a plan which would be cheaper by half, but would cause the grain to make its outlet elsewhere. So the transportation problem to Montreal, Boston, Philadelphia, Baltimore, New Orleans means little more than the method necessary to divert exports and imports from New York to themselves.

When we have air ships which do not stop on the coast, seaports will be the most unfavorably situated of all cities, and though such vehicles, were they possible, would seem to be the most perfect of all carriers, eliminating absolutely all transfers and middlemen between the producing and consuming population, commercial cities cannot be expected to long for them; no more can they be expected to desire any other improvement in transportation which will make their own intermediation useless: that would be desiring their own destruction. Chicago will never favor a scheme which will save nine-tenths of the cost of carriage of grain from the Northwest to Liverpool—and make it go by way of St. Louis; New York will have no enthusiasm for a route which reduces the cost of transporting grain from Chicago to the seaboard to five cents a bushel—and reaches it by way of Montreal.

Thus of the most honest and earnest advocates of "cheap transportation" in the conventions, and the newspapers as well, the largest part, doubtless, are really working for the advantage of some place which makes or may make exchanges, and not primarily for a reduction in the cost of the exchanges. This complicates the matter greatly, especially when the whole country is called upon to pay the cost of the plans proposed; for an expenditure of a hundred millions or so might very well help the trade of New York, New Orleans or Richmond, while destroying that of other cities and yielding no advantage to the country at large; and when such schemes are proposed and urged as of national importance, the fact that its promoters must be influenced by these local considerations justifies us in suspecting that their particular interests make them unsafe judges of the effect of the plan of the national welfare.

Passing from the general to the particular, we will be best able to gather the quality and aims of the Association which met at Richmond by what its members proposed, and what the convention did.

Glancing over the reports of the proceedings, we find that the following propositions were made for the solution of the transportation problem, as different members saw it:

The Committee on Railroads, reporting through Mr. F. B. Thurber, of New York, announced that competition is what is needed, that the most effective competition will come from railroads owned by the people, that improvement of our principal water courses and the construction of short lines of canal between large bodies of water are also necessary, and "that certain laws of a general character will also be found useful as auxiliaries, pending the construction of the above-mentioned works."

The Committee on Artificial Water Routes, of which Col. B. W. Frobel, of Georgia, is Chairman, reported a series of wonderful affirmations, one of which is that "the wealth of the field, the forest and the mine" in this country is "valueless," for want of outlets to consumers, and that a metallic currency will be restored by "the means of exporting our grain and flour and bacon and corn and tobacco and cotton at prices which will enable us to sell these products in the market of other countries," and resolutions which declare that Congress should during this session provide means for the four great water routes recommended last winter by the Senate Transportation Committee—that is, the improvement of the Mississippi, the canal to connect the Tennessee with the Chattahoochee or other river of Georgia, the James River and Kanawha Canal, and the enlargement of the New York canals.

Mr. James C. Southall, of Richmond, advocated the James River & Kanawha Canal, apparently as a sufficient substitute for all other schemes.

Mr. D. G. Conant, of St. Louis, urged action by the present Congress to secure "the immediate construction of such works at the mouth of the Mississippi as will insure the safest, most commodious and untrammeled navigation between that river and the Gulf of Mexico which science and money can provide."

Mr. John Thompson, of North Carolina, in view of the completion of the Suez Canal, recommended such government aid as will secure the speedy completion of the Texas & Pacific Railway.

Gen. T. L. Rosser, of Minnesota (late engineer in charge of the surveys of the Northern Pacific), proposed a memorial to Congress to pass laws to prohibit any combinations or of competing railroad lines, the watering of stock, and to establish a "Court of Commercial Justice" to try all cases of "violation by the transportation companies of this country of the principles of justice and fair dealing," with power to supervise and alter the rates of freight and fares.

Gen. A. T. Piatt, of Ohio, offered resolutions against any increase of the bonded debt of the country (apparently aimed against any government canals or railroads) and affirming "that railroads are public highways, and those who manage them are but public servants whose pay is to be regulated by law."

Mr. C. A. Clarke, of Illinois, wished the Convention to declare "that Congress should fix by law a maximum for all railway traffic crossing State lines."

Col. William Johnson, of North Carolina, wished it to request Congress to adopt 4 ft. 8½ in. as the standard national gauge, and to offer sufficient inducements to lead all lines as much as 200 miles long to adopt that gauge.

The Committee on Resolutions, reporting through Major Lyman Bridges, of Chicago, reported in favor of Mr. Frobel's resolutions in favor of four water routes ("there's millions in it"), and of aid to the Texas & Pacific, on condition that Congress have power to control their tolls and rates and their combinations with other lines.

Hon. R. M. T. Hunter, from the Committee on Reports, reported in favor of laws against watering stock, compelling the posting of rates, prohibiting railroad men from being interested in companies running cars over their road or furnishing it supplies, against "unjust discriminations" and free passes, prohibiting members of Congress and other legislators from appearing as counsel in cases involving public interests, in favor of State railroad commissions and a national "Department of Industry and Commerce," with a Bureau of Transportation, and general action by the United States which will tend to favor competition.

Mr. D. G. Conant, of St. Louis, proposed a law for granting United States charters for railroads crossing State lines.

Mr. M. B. Lloyd, of the Illinois State Farmers' Association, recommended a double-track freight railroad to be provided for by an issue of 3.65 bonds.

The Committee on Resolutions being divided on the question of making the subsidy of the Texas & Pacific dependent on its giving Congress control of its rates, a minority reporting against the condition, the minority report was adopted by a vote of 77 to 34.

Mr. Dore wanted the government to establish shipyards in the West for constructing iron steamers.

Mr. W. M. Potter, of Iowa, urged the construction by government of a canal from Hennepin, Ill., to Rock Island.

Mr. Widderburn, of Virginia, wished the extension of the Chesapeake & Ohio Canal to be included in the number of those to be constructed by the government.

A recommendation that the tolls on the Erie Canal be reduced so as to cover the cost of working expenses and maintenance, and not any interest on cost, was adopted.

These were, so far as the newspaper reports show, all the propositions made in the convention for securing cheaper transportation for the United States.

When we come to the action of the convention, we find that it adopted Mr. Hunter's report in favor of certain restrictive laws (not, however, restricting rates, if the summary published be correct) applying to railroads; requested the State of New York not to collect interest on the cost of the Erie Canal, and adopted a memorial to Congress urging it to provide for the construction of a perfect outlet of the Mississippi; a canal over the Appalachian range in Tennessee and Alabama; another over and (for it contemplates a canal tunnel eight miles long) through the same range in Virginia and West Virginia; a similar costly work, though a deepening and improvement and not wholly a new construction, in New York; a canal from the Illinois River, near Hennepin, westward to the Mississippi at Rock Island (wholly within the State of Illinois), and a great double-track freight railroad from some point on the seaboard to some point in the West, and (as nearly as we can learn from the report) a subsidy for the Texas & Pacific. The work of construction so recommended is estimated to cost about $325,000,000, would probably cost a corporation skillful in conducting affairs not less than $400,000,000, and would certainly cost the Government very much more.

We believe that this convention, whatever else may be said of it, showed a disposition to spare no expense in order to save money. Six per cent. on the proposed investment would amount to more than one-third of the total dividends earned by the seventy thousand miles of railroads in the United States last year, and the advantage would need to be immense in order to justify the expenditure.

While a canal connection of the Ohio and Mississippi rivers with Atlantic waters was spoken of as sufficient to revolutionize the industries of this country, no one seemed to recognize the fact that there are or have been several such connections. Why have not these immense advantages, or a large part of them, resulted from the Illinois & Michigan Canal, many years open and still thriving, which unites the Mississippi with Lake Michigan, or from the Wabash & Erie Canal, through Indiana and Ohio to Lake Erie, or the Miami Canal, the Pennsylvania & Ohio Canal, the Erie & Pittsburgh Canal, which also unite the Ohio with Lake Erie? All these unite the whole water system of the Mississippi Valley with Atlantic waters, and though not on so large a scale as those now recommended to Congress, they should yet be of immense value, locally and nationally, if these proposed canals would have so prodigious an effect on the cost of transportation. But of all these only one can be said to be successful, and two or three others have been abandoned simply because it does not pay to keep them open. And when we come to large canals, intended chiefly to carry the grain of the Northwest to the seaboard, it seems to have escaped the advocates of these enormously costly water routes that there is now in construction a canal at once larger and cheaper than any of their proposed lines can possibly be made, which will enable not only boats but large ships to make their way from the great grain centers of the Northwest to tide water, a channel which the United

States is not asked to pay a cent for, and which when completed will make it almost impossible that any of the proposed lines should carry enough of our grain exports to support it.

It may be that the newspaper reports have passed over or made only slight mention of the really valuable work which came before the Cheap Transportation Association, but if they represent it fairly, there can be little hope that it will advance the cause to which it is ostensibly devoted.

Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information of the laying of tracks on new railroads as follows:

Bucksport & Bangor.—Completed by an extension northward 4 miles to Bangor, Me. *Warwick.*—Completed from a junction with the New York, Providence & Boston five miles south of Providence southeast 5 miles to Warwick Neck, R. I. *New Jersey & New York.*—Extended north 11¼ miles to Haverstraw, N. Y. *Washington & Ohio.*—Extended from Purcellville westward 4 miles to Round Hill, Va. *Flint & Pere Marquette.*—Completed by an extension west 5 miles to Lake Michigan at Ludington, Mich. *Fort Scott & Southeastern.*—The first track has been laid from Fort Scott, Kansas, southeastward 7¼ miles. *Palisade & Eureka.*—Extended from Lodi, Nevada, southward 8 miles.

This is a total of 45 miles of new railroad, making 1,731 miles completed in the United States in 1874, against 3,456 miles in 1873 and 6,559 in 1872.

The English Engine-Driver.

It is one of the most singular facts connected with modern literature that the deep and striking poetry of the rail and the locomotive has never yet inspired any man of genius to sing it forth to the world. Probably it is a consequence of the classical training of modern youth. Our poets get mad over the achievements of Greeks and Romans, over the Isthmian and other games, and seem absolutely blind to the fact that the things which put them into ecstacies are quite childish compared with the everyday marvels of the age we live in. No doubt "distance lends enchantment to the view;" still the Greek charioteer who, standing on a very rickety two-wheeler, whips his horses along in the Olympian races, is at best a prosaic figure when placed in contrast to an engine-driver on any of our great lines of railway. The fire-horse of our modern steam-charioteer is infinitely more majestic than the noblest stallion seen in old Greece, and the speed at which he flies through the air is, compared with that of the Isthmian games, as the eagle's flight is to the crawling of the snail. In simple truth there is scarcely anything done by human beings that approaches in daring, in true and absolute heroism, to the hurling of an express train through space at the rate of a mile a minute and more, a speed far superior to the velocity of the hurricane. That the steam charioteer rides along safely in night and darkness, through storm and rain, on his snorting fire-horse, detracts nothing from the innate grandeur of the deed, but even adds to it. Strong and muscular, and in the full power of virile health as the engine driver may be, he is, after all, but a dwarf handling gigantic forces, and handling them by his intellect only. The horseman with fleriest Arab under him has his knees and hands to govern the steed that carries him; but the rider on the locomotive is more helpless, as regards physical strength, than an infant on the back of a lion. Still, the locomotive-rider guides the flaming giant whom he bestrides as coolly and with as firm nerve as if it were a plaything in his hand. Were it not that the repetition of the daily and hourly sight had destroyed the faculty of wonder and stunted the imagination, men would look awestruck upon the tiny individual on the back of the great fire-horse, soaring through space in a circle of flame, with a cargo of human beings harnessed behind in iron chains. As it is, familiarity has bred contempt; but, notwithstanding, the fire-horse remains a marvel of marvels, and his rider a hero of the best type.

The master of the locomotive, though perhaps not willing himself to be a hero of romance, is, for all that, a very real, if quiet and unassuming, hero. There is something most manly, firm and of the true heroic about all engine-drivers, more especially those who have seen many years of service, and are trusted with fast and express passenger trains traveling long distances. Engine-drivers of the latter class are seldom under forty years of age, and being picked men, fully conscious of the immense responsibility of their position, and accustomed to look with clear eye and unflinching brow upon danger and death, daily braving the elements in the simple execution of their duty, they are, as a rule, singularly calm and self-possessed. Very young engine-drivers there are none indeed, owing to the long practical training through which all have to go. Before becoming the driver of a locomotive, a man must have been a fireman, or, as often called, a stoker, and most firemen again do not obtain their post without passing a previous apprenticeship as cleaners of engines, or similar occupation, in which they get a practical acquaintance, if only in the shed, with railway locomotives. It might seem that mechanical engineers, those who have the construction of engines, would make the best drivers, but experience has shown that this is not so. The requirements of the workshop are entirely different from those demanded on the iron highroad, and frequent trials to this effect on our early lines went to show to conviction that the mechanical workmen may be, and mostly are, the very worst engine-drivers. This being so, the school of the railway servant aspiring to get a place on the board of a locomotive is entirely a practical one, and may not inaptly be compared to that which a man has to go through who wants to learn horsemanship. The study of veterinary surgery, and the anatomy of the horse, is no more required by the good rider than the art of locomotive construction by the good engine-driver; but in either case, with the fire-horse as with the flesh-and-blood horse, what is wanted is practical skill of management, largely guided by experience. It is to acquire skill by experience that the engine-driver has to come out of the fireman and, in most cases, the engine-cleaner. It is very seldom that a man is made a driver who has not been at least six years a fireman, and even then he is not put at once into regular work, but has to go through another kind of apprenticeship. The first stage of the newly-appointed driver is on the board of a pilot or shunting engine. Put in command of an engine near a station, or a goods depot, he has to haul in and out trains, which work, though requiring undivided attention and much skill, is the less responsible as being done under the eye of superior officers, such as station-masters and superintendents. The pay of this first period begins usually at the rate of five shillings a day, advancing gradually to six shillings. When the new driver is found to have acquired sufficient skill in shunting lines of carriages short distances—which may be in a year or two, or may extend over many years—he is promoted to undertake the haulage of goods trains. His pay now is generally from six shillings to six shillings and sixpence per diem, rising occasionally a little higher, but being also sometimes a little less. Finally, this other ordeal passed, he becomes the driver of passenger trains, at first of slow or local trains, and in the end of fast trains. The pay of this highest class driver, a senior in all respects, is from seven shillings to seven shillings and sixpence per day. Seven and sixpence is the maximum on most of our smaller railways, notably those south of the Thames; but the maximum is considerably surpassed in the pay given to the most trusted engine-drivers on the great lines running northward and westward from London, and the trains of which are unsurpassed for speed and excellence. The Great Western Company give the high pay of nine shillings and sixpence a day, besides a bonus of ten pounds per annum, to a few veterans in the service, drivers of expresses. The nine and sixpence, among others, are the "compensation" of the dauntless iron-sinewed charioteers who drive the "Flying Dutchman," fastest train in the world, from London to Bristol. No hurricane that ever blew in our latitudes ever traveled at the speed of the "Flying Dutchman."

On most of our great lines of railway the hours of duty of the engine-driver, like the hours of work of the guard, vary from day to day. The driver generally follows a time-bill under the regulations of which every week-day gives him a different train, with additional changes on Sundays, the whole so arranged that he has alternately day and night duties, and has besides about one-half of the Sundays in the year for days of rest. Experience, the guiding principle in all railway management, has shown that this system is the best that can be made, and it is certain that as it works well so it gives thorough satisfaction to the drivers, more especially to those best able to form a judgment, the veterans of the service. The time-bill of one of these veterans, a Great Western man, may serve to illustrate the arrangement under which the engine drivers on our great lines perform their duties. He takes on Monday the 6.45 a. m. train from Paddington to Bristol, arriving at 10.20 a. m., and leaving Bristol again with the 12.9 p. m. train—the return "Flying Dutchman"—gets back to Paddington at 2.45 p. m., having gone over 240 miles of road within just eight hours. The next day, Tuesday, our veteran takes the 9 o'clock morning train from Paddington, due at Bristol at 12.15 p. m., and brings back the train which leaves Bristol at 2.45 p. m., and gets into Paddington at 6 o'clock in the evening. On the third day, Wednesday, he carries off the 10:30 a. m. train from Paddington, gets to Bristol at 3:5 p. m., leaves again at 7 o'clock in the evening, and is back at Paddington at 10:20 p. m. Thursday, the fourth day, gives him the 11:45 a. m. train—the "Flying Dutchman" taking wings westward—which arrives at Bristol at 2:21 p. m., and he leaves again with the 3:50 p. m. train, which reaches Paddington at 10:5 p. m. On the fifth day, Friday, he leaves Paddington, for the first time in the week, in the afternoon, taking away the 2:30 p. m. train to Bristol, due at 9 in the evening, and bringing back the night mail train, which leaves Bristol at 12:40 a. m., arriving at Paddington at 3:55 a. m. Finally, on Saturday, our driver does not leave Paddington till late in the evening, this being "shed day," when he has to give about four hours to the superintendence of boiler washing, the packing glands, and similar labors. This done, he takes the 8:10 p. m. out of Paddington, arriving at Bristol five minutes after midnight, and leaving again shortly after with the 12:50 a. m. train, due at Paddington at half-past 4 in the morning. Thus runs the week's work of our veteran, and there remains that of the Sundays. This, too, varies, the time-bill changing each Sunday in such a manner that he is four Sundays on duty and the three following Sundays free from any work. On the first of the four Sundays he takes the 10 o'clock morning train from Paddington to Bristol, arriving at half-past three o'clock in the afternoon; leaving Bristol again with the half-past 6 o'clock train, and getting back to Paddington ten minutes after 11 o'clock in the evening. Having been more than twelve hours on duty he is paid at the rate of a day and a half for the double journey, being fourteen shillings and threepence. On the second Sunday he takes the half-past 2 o'clock afternoon train from Paddington to Bristol, arriving at half-past 7 in the evening, and starting again from Bristol ten minutes to 1 next morning, to get back to Paddington at 5 minutes to 4. For this double journey, too, he earns one and a-half day's pay. The third Sunday he does not leave home till late in the evening, starting with the 8:10 p. m. train from Paddington, and bringing back, after little more than half an hour's stoppage, the 12:50 a. m. train. Finally, on the fourth and last Sunday on which he is on duty, our veteran has assigned to him, by way of change, two double journeys from Paddington to Windsor, beginning work at 2 o'clock in the afternoon, and leaving off at a quarter to 11 in the evening. Taking the entire number of hours on duty a week, leaving out the free Sunday, but adding an hour to each journey—the prescribed time during which the engine-driver has to be at his post before starting—the average daily number of hours of work is found to be eleven. It is nominally twelve on most of our lines of railway, but the maximum is not reached except under great pressure of business, and when it is surpassed the pay is calculated at the rate of a day and a-half. Railway companies, as a rule, treat the drivers of their engines, especially those recommended by years of service, with marked liberality—as marked as in most instances it is well deserved.

Considering the extremely fatiguing nature of his duties, his exposure to rain and wind and all the extremes of heat and cold, and the wear and tear of mental anxiety he has constantly to undergo, and which reaches a climax when snow and fog, his great enemies, obstruct his outlook, the work of the engine-driver is truly astounding as to its extent and amount. The average distance traveled over by the drivers of passenger trains on our smaller lines, as representative of which the South Eastern may be taken, is 800 miles a week, or about forty thousand miles a year; but this average is far surpassed by the drivers of the great express trains on the lines north of the Thames. A careful calculation of the distances traveled by the Great Western driver whose time-bill has been analyzed, shows that in the course of one year, commencing the 4th of November, 1873, and ending the 3d of November, 1874, he hauled his trains, often at express speed, over 65,323 miles of ground, being an average of 1,256 miles per week. It seems terrible work; still the veteran here referred to, upwards of twenty-two years in the service of the Great Western, testifies, with many others, to the fact that the exertions gone through, great as they are, do not only not affect the health of a strong man with good nerves, but fortify his constitution, so as to harden it against age and disease. It is certain that engine-drivers, as a class, look extremely florid and healthy, and mostly younger than they really are. No doubt they get abundance of ozone into their lungs, and if they will only stave off the enemy rheumatism by good flannel armor and temperance—the latter universal among the best drivers, not a few of whom are teetotalers—they have as much chance of living to the age of Methusaleh as any of the most favored classes of the community, including country parsons. Besides, great as are the physical hardships the engine-driver has to undergo, there is some compensation for it, as for most things, in a corresponding feeling of elation, which no habit can altogether destroy, from flying through space with enormous swiftness. If Dr. Samuel Johnson held it the greatest joy of human life to travel in a post coach with four horses at the rate of twelve miles an hour, the man who rides the "Flying Dutchman" must surely feel at times, if not always, a joy of superhuman intensity by getting through space five times as fast—at a greater rate of velocity, indeed, than anything that ever moved on the face of the earth, except a cannon ball. There are men of birth and education who, properly trained, act occasionally as engine drivers—a well known instance of the kind exists on one of our Southern lines—and they confess that there is an excitement and a charm that nothing can excel in the riding of the fire horse. It may be said of the engine-driver as of no other mortal man, "He hath his way in the whirlwind and in the storm."—*London Railway News.*

General Railroad News.

ELECTIONS AND APPOINTMENTS.

—At the annual meeting of the Pittsburgh, Washington & Baltimore Railroad Company in Pittsburgh, Pa., December 7, the following directors were chosen: Wm. S. Bissell, G. L. B. Fetterman, Wm. Baldwin, Pittsburgh; George R. Dennis, Frederick, Md.; Mendes Cohen, Wm. K. Riser, John Donnell Smith, Wm. H. Perkins, H. G. Vickery, F. Sisson, Charles Webb, Israel Cohen, Baltimore.

—The directors of the Pacific Mail Steamship Company have elected Mr. Francis A. Alexandre, President, in place of Russell Sage, resigned, and W. H. Fogg a director, to fill Mr. Sage's place on the board.

—At the annual meeting of the Washington City, Virginia Midland & Great Southern Railroad Company in Alexandria, Va., November 30, Mr. John S. Barbour was unanimously re-elected President, with the old board of directors, as follows: E. C. Marshall, Fauquier County, Va.; S. A. Coffman, Rockingham County, Va.; Daniel F. Slaughter, Culpeper County, Va.; W. D. Hart, Albemarle County, Va.; R. A. Coghill, Amherst County, Va; W. C. Sims, Pittsylvania, County, Va.; W. G. Cazenove, C. S. Suttle, Alexandria, Va.; C. M. Blackford, T. C. S. Ferguson, Lynchburgh, Va.; G. F. Pace, W. P. Clarke, Danforth, Va. The following stockholders were appointed the Examining Committee for next year: James M. Booker, J. M. Chapman, John G. Meem, Wm. H. Payne, W. P. Shepherd.

—The new board of directors of the Connecticut Western Railroad Company has re-elected the old officers, as follows: President, William H. Barnum, Salisbury; Vice-President, George M. Bartholomew, Hartford; Treasurer, William L. Gilbert, Winsted; Secretary, George S. Frink.

—The following appointments have been made on the New York State Canals: Horatio Seymour, Jr., Assistant Engineer in charge of Eastern Division, Erie Canal; Patrick Kinney, Assistant Engineer, Champlain Canal.

—Mr. T. D. Sheridan has been appointed Agent for the Grand Trunk Railway at Buffalo, N. Y., in place of J. R. A. Matthews, transferred to Bangor, Me.

—At the annual meeting of the Richmond & Petersburg Railroad Company in Richmond, Va., last week, Frederick R. Scott was re-elected President, with the old board of directors, as follows: H. K. Ellyson, B. W. Haxall, Richmond, Va.; Dr. T. W. Lassiter, Petersburg, Va.; R. R. Bridgers, Wilmington, N. C.; W. T. Walters, Baltimore.

—Mr. O. S. Lyford, formerly of the Hannibal & St. Joseph, and at one time on the Erie, has been appointed General Superintendent of the Kansas Pacific and Denver Pacific Railways, in place of E. S. Bowen, who went to the Erie some months since.

—At the annual meeting of the Bingham Canon Railroad Company in Salt Lake City, Utah, November 27, the following directors were chosen: George Goss, W. B. Welles, Salt Lake City; B. W. Morgan, Charles Lockhart, Pittsburgh, Pa.; C. W. Scofield, New York. The board subsequently elected the following officers: C. W. Scofield, President; B. W. Morgan, Vice-President; W. B. Welles, Secretary and Treasure, George Goss, Superintendent.

—At the adjourned meeting of the stockholders of the Northern Central Railway Company in Baltimore December 8, the following directors were chosen: S. M. Shoemaker, George Small, M. B. Greensfelder, R. Oppenheimer, Baltimore; Wayne McVeagh, Harrisburg, Pa.; S. M. Felton, Wistar Morris, Thomas A. Scott, H. P. Borie, J. N. Hutchinson, J. C. Bullitt, Philadelphia. The new directors are Messrs. Greenfelder, Oppenheimer, McVeagh, Felton, Borie, Hutchinson and Bullitt, who replace W. Colder, A. Kapp, Henry Welsh, E. C. Biddle, J. M. Kennedy, B. F. Newcomer and J. P. Jones. Subsequently Thomas A. Scott was chosen President in place of J. D. Cameron, and A. J. Cassatt a director in place of Colonel Scott.

—At a meeting of the directors of the Evansville, Owensboro & Nashville Railroad Company in Louisville, December 3, President Weir and a number of the directors resigned and the following were chosen to fill the vacancies: President, Morris McDonald, New Albany, Ind.; directors, R. S. Brevier, Robert Browder, James Weir, John G. Barrett, Rudolph Fink, James Todd, J. J. Brown. The new directors represent the creditors of the company.

TRAFFIC AND EARNINGS.

—The earnings of the St. Louis & Southeastern Railway for October were: 1874, St. Louis Division, $83,665.53; Nashville Division, $48,199.50; total, $131,865.03. 1873, total, $122,567.79; increase, $9,297.24, or 7⅝ per cent.

—The anthracite coal tonnage of the lines given (whose year begins December 1) for the year ending November 30 was as follows:

	1874.	1873.	Inc. or Dec.	P.c.
Philadelphia & Reading	6,348,812	6,546,553	Dec. 197.741	3
Schuylkill Canal	717,507	743,796	Dec. 26,289	3½
Lehigh Valley	4,150,660	4,144,340	Inc. 6,320	0½
Pennsylvania & New York	698,836	674,653	Inc. 24,183	3½
Totals	11,915,815	12,109,342	Dec. 193,527	1⅝

—The Buffalo *Commercial Advertiser* gives the following statement of the receipts of flour and grain at that city for the eleven months ending December 1:

	1874		1873	
	Flour, bbls.	Grain, bus.	Flour, bbls.	Grain, bus.
By railroad	1,524,652	24,859,420	no report.	20,302,500
By lake	1,311,402	54,967,637	1,080,463	65,190,365
Totals	2,836,054	79,826,057	1,080,463	85 492,865

The railroads brought nearly 54 per cent. of the flour and over 31 per cent. of the grain this year, and about 24 per cent. of the grain last year.

The shipments of grain eastward for the same period were:

	1874.	1873.
By canal, bushels	40,944,497	50.854,076
By rail	11,033,082	8,883,576
Totals	51,977,579	59,737,652

Rail shipments were about 21 per cent. of the whole in 1874, and 15 per cent. in 1873.

—The earnings of the Michigan Central Railroad for the third week in November were: 1874, $128,051; 1873, $115,876; increase, $12,175, or 10½ per cent.

—The earnings of the Keokuk & Des Moines Railroad for the six months from April 1 to September 30 were:

Earnings ($2,169 per mile)	$349,195 20
Expenses (64.66 per cent.)	225,786 78
Net earnings ($766 per mile)	$123,408 42

The net earnings were 4.82 per cent. on the funded debt.

—The earnings of the Great Western Railway of Canada for

the week ending November 13 were: 1874, £20,513; 1873, £21,493; decrease, £980, or 4¼ per cent.

—The earnings of the Grand Trunk Railway for the week ending November 14 were: 1874, £45,400; 1873, £45,000; increase £400, or 08-9 per cent.

—The shipments of through freight east over the Central Pacific road during October were: San Francisco, 4,210 tons; interior points, 1,287 tons; total, 5,497 tons, or 550 car-loads. The principal items were: wool, 1,283 tons; tea, 652 tons; barley, 578 tons; ripe fruit, 594 tons.

—The earnings of the St. Louis, Iron Mountain & Southern Railway for November were as follows:

	1874.	1873.
Passengers	$ 81.200	$ 55,455
Merchandise	253,700	130,631
Iron and ore	5.800	13 842
Sundries	10,160	9,694
Total	$350,860	$209,622

Increase, $141,238, or 67¾ per cent.

—The number of freight cars passing through Indianapolis on the various roads centering in that city, as taken from the books of the different companies, for the eleven months ending November 30, was 657,497, which would make 21,917 trains of 30 cars each, an average of 66 trains daily.

—The earnings of the Bingham Canon Railroad for the eleven months ending October 31, 1874, were:

Earnings ($6,453 per mile)	$103.247 39
Expenses (39.43 per cent.)	40,711 76
Net earnings ($3,909 per mile)	$62.535 63

The road carried 60,165 tons of freight.

—The tonnage of anthracite coal over the lines given for the eleven months ending November 28 was as follows:

	1874.	1873.	Inc. or Dec.	P. c.
Del., Lacka. & Western	2,351,911	2,859,946	Dec. 508,035	17¾
Lehigh Div., Central of N. J.	2,559,720	2 625.817	Dec. 66 097	2½
Dela. & Hudson Canal Co.	2,173,531	2,619.868	Dec. 446,337	17
Pa. Coal Co., by Erie Ry.	1,214,734	1,139,390	Inc. 75,344	6¾
Shamokin Div., Northern Central	550,133	595,398	Dec. 45,265	7½
Totals	8,850,029	9,840,4 9	Dec. 990,390	10 1-16

—The coal tonnage of the Pennsylvania Railroad for the eleven months ending November 28 was, coal, 3,103,947 tons (2,240 pounds); coke, 442,764 tons; total, 3,546,711 tons, or 354,671 car-loads, equal to 8,867 trains of 40 cars each.

—The earnings of the Richmond & Petersburg Railroad for the year ending September 30, 1874, were:

Earnings ($5,889 per mile)	$147,220 15
Expenses 63.95 per cent.)	94,152 86
Net earnings $2,123 per mile)	$53,067 29

—The tonnage of bituminious coal over the lines given for the eleven months ending November 28 was as follows:

	1874.	1873.	Inc. or Dec.	P. c.
Huntington & Broad Top	279,000	435,366	Dec. 156,366	35¾
Clearfield coal over Tyrone Div., Pa. R. R.	610.127	564,769	Inc. 45,358	8
Pa. & N. Y., (twelve months)	292,709	288,053	Inc. 4,656	1⅝
Totals	1,181,836	1,288,188	Dec. 106,352	8¼

—The tonnage of Cumberland coal over the various lines for the eleven months ending November 28, was as follows:

	1874.	1873.	Inc. or Dec.	P. c.
Baltimore & Ohio	1,292,555	1,468,040	Dec. 175,485	12
Chesapeake & Ohio Canal	751,127	772,144	Dec. 21,017	2¾
Bedford Div., Pa. R. R.	64,644	101,883	Dec. 37,239	36½
Totals	2,108 326	2,342,067	Dec. 233.741	10

—The following companies have thus far reported earnings for November:

	1874.	1873.	Inc.	Dec.	P. c.
Atlantic & Pacific	$406,900	$397,485	$ 9,415	.....	2¾
Bur., Cedar Rapids & Minn	109.536	105,430	4,106	.....	3⅞
Central Pacific	1,314,000	1,228.751	85,249	.....	7
Chicago, Dan. & Vincennes	71,193	64,230	6,963	.....	10¾
Cleve., Col., Cin. & Ind.	336,748	320,266	16,482	.....	5⅛
Illinois Central	642,238	636,039	6,199	.....	0.15-16
Marietta & Cincinnati.	186,995	160.488	26,507	.....	16½
Mobile & Ohio	287,845	236.635	51,210	.....	21⅔
Ohio & Mississippi	209.597	265,242	44,355	.....	16¾
St. Louis, Alt. & T. H., main line	111,645	89,844	21,801	.....	24¼
St. Louis, Alt. & T. H., branches	46,787	42 042	4,745	.....	11¼
St. Louis, Iron Mt. & Southern	350,860	209,622	141,238	.....	67⅔
Toledo, Peoria & Warsaw	73,802	82,596	.....	$8,794	10⅔
Toledo, Wabash & Western	403,319	369,605	33,714	.....	9⅛

—The earnings of the Central Pacific Railroad, for November were, 1874, $1,314,000; 1873, $1,228,751; 1872, $1,293,957, increase, 1874 over 1873, $85,249, or 7 per cent.; increase, 1874 over 1872, $20,043, or 1¼ per cent.

For the eleven months ending November 30 the earnings were: 1874, $13,138,903; 1873, $12,803,027; 1872, $11.88 6,969; increase, 1874 over 1873, $335,876, or 2¾ per cent.; increase, 1874 over 1873, $1,251,934, or 10½ per cent.

—Chicago receipts for the week ending Dec. 5 show a decrease of 6 per cent. in flour, 48 per cent. in wheat, 22 per cent. in oats, and 4 per cent. in live hogs, and an increase of 18 per cent. in dressed hogs and 43 per cent. in cattle compared with the receipts for the corresponding week of last year.

—Grain receipts at the six Western lake ports, St. Louis and Peoria for the week ending Nov. 28 were 2 per cent. greater in flour, 30 per cent. less in wheat, 100 per cent. greater in corn, and 20 per cent. less in corn than for the corresponding week last year.

—For the period from Aug. 1 to Nov. 28 the receipts at the six Western lake ports, St. Louis and Peoria, were 2,079,531 barrels of flour and 62,290,252 bushels of grain of all kinds in 1874, against 2,164,702 barrels of flour and 76,046,781 bushels of grain in 1873, showing a decrease of 4 per cent. in flour and 18 per cent. in grain.

—The receipts of grain of all kinds and flour at Baltimore for the eleven months ending November 30 were:

	1874.	1873.	Increase.	P. c.
Grain, bushels	9,836.098	7,495,706	2,340,392	31¼
Flour, barrels	1,441,170	1,236,989	204,181	16½

—The receipts of tolls on the Erie Canal at Buffalo from the opening of the season to December 1 were: 1874, $1,196,360; 1873, $1,415,494; decrease, 219,134, or 15½ per cent. The number of boats cleared was: 1874, 7,628; 1873, 9,061; decrease, 1,433, or 15¾ per cent.

—The number of hogs packed in the West from Nov. 1 to 28 is reported at 1,786,466 in 1874, against 1,823,702 for the same time last year, 1,183,760 in 1872 and 1,423,595 in 1871. Chicago this year has packed three times as many as any other place, Louisville standing second and Cincinnati third.

—The petroleum exports of the United States for the period from Jan. 1 to Nov. 28 were 217,294,816 gallons in 1874, 223,-120,592 in 1873, 135,929,341 in 1872, and 145,072,961 in 1871.

—The production of anthracite coal from all regions for the week ending Nov. 21 was 455,320 in 1874, against 380,623 tons last year, and from the 1st of January to the 21st of November the total production was 17,614,652 tons this year and 18,244,-468 tons last, showing a decrease of 629,816 tons, or less than 3½ per cent.

PERSONAL.

—Mr. Russell Sage has resigned his position as President of the Pacific Mail Steamship Company.

—Mr. Charles N. Talbot, a retired New York merchant of some wealth and a member of the board of managers of the Delaware & Hudson Canal Company, died recently.

—Col. James W. Robertson resigned his position as General Superintendent of the Macon & Brunswick Railroad, December 1.

—Col. Samuel B. Thomas, a well-known railroad man and wealthy citizen of Elizabethtown, Ky., died at the Galt House, in Louisville, Ky., December 3.

—The civil engineers connected with the Eastern Division of the New York Central & Hudson River road (Albany to Syracuse) celebrated the close of the active work of the season by a supper at Albany, November 30. About 20 were present and the supper and following speeches were highly enjoyed by those present. Speeches were made by Chief Engineer C. H. Fisher, Division Engineer S. C. Wurtele and others. It was resolved that the supper be repeated each year, near Thanksgiving time. It was also decided to hold a union supper, attended by the engineers of both divisions, at Syracuse, on some evening about New Year's.

THE SCRAP HEAP.

Railroad Manufactures.

The Manchester (N. H.) Locomotive Works are running on orders for a number of engines from the Intercolonial and Northern Colonization roads in Canada.

The Wason Car Company of Springfield, Mass., has taken a contract to build 70 cars for a railroad in South America. This, with the large contract recently taken for the New Jersey Central, will keep the shops busy for some time. The force employed is to be increased to 600 men.

Gilbert, Bush & Co., of Troy, N. Y., have been building some passenger coaches for the Canada Southern road.

The Beverly (Mass.) Machine Works are building a lot of contractor's steam shovels, for M. D. Marcy, of Worcester.

The rail mill of the Rensselaer Iron Works at Troy, N. Y., was to start up last week with the old hands if they choose to return to work under the reduction; without them if they decline so doing.

The puddling department of the Philadelphia & Reading Railroad Company's rolling mill, at Reading, Pa., will probably run full time all winter. The rail mill will only run one-half or one-third time.

The Lochiel Iron Works at Harrisburg, Pa., have started up and are running full time.

The Rome (N. Y.) *Sentinel* says of the suspension of the iron works at that place: "Work at the merchant iron mill is suspended, we hope only for a brief season. The suspension is not the result of a strike, as the relations between the superintendent and the employees are of the most pleasant character, but the relations between these employees who are Union men, and other Unions, have made this suspension seem advisable to them. It is in some respects a singular suspension, but is fortunately marked by no ill-will and will probably prove but temporary."

The Southwestern Car Works at Jeffersonville, Ind., recently delivered 30 freight cars to the Chicago, Danville & Vincennes road.

The Indianapolis Rolling Mills have an order for several hundred tons of iron rails for the Indianapolis, Bloomington & Western road.

Durable Iron Rails.

The Davenport (Ia.) *Gazette* says that iron rails were recently taken up from nine miles of the Rock Island road, between Summit and Wilton, Ia., which were laid in 1862 and have been continuously in service for the 12 years. Steel rails have been substituted for the iron.

Train Tools.

The Illinois Railroad Commissioners have sent out the following circular to all companies in the State:

"Your attention is called to section 34 of an act of the Legislature, approved March 31, 1874, and in force July 1, 1874, Revised Statutes, page 813, which is as follows:

"'That every railroad corporation shall furnish each car used for the transportation of passengers with one woodman's axe, one handsaw, one sledge hammer and two leather buckets, said articles to be kept in good repair, ready for instant use, in some convenient place in each car, and easy of access in case of collision or other accident.'

"If your company has not already complied with the provisions of this law, we trust the subject will receive your immediate attention, so that no occasion may be had for a resort to the courts to enforce the penalties therein prescribed."

Prices of Rails in November.

Bigelow & Johnston report foreign iron at $49 to $50 gold, and American iron at $50 to $55 currency; foreign steel nominal, and American steel at $75 to $80 per ton; old rails at $29 to $29.50. There were no imports of iron and only 24 tons of steel at the port of New York during the month, and during the eleven months ending with December the imports of iron were 0 tons against 41,449 last year, and of steel 68,509 tons, against 87,761 tons last year. The imports of steel have been about enough to supply 700 miles of ordinary road. The firm say:

"*New Rails.*—The season for inland navigation and for work on railroads being nearly over, the business of the past month has been very light, and a foreshadowing of the usual winter's inaction. About 1,000 tons 56 lb. English were sold at $49¼ gold, thus reducing the available stock of *foreign* make to a few thousand tons. For *American* there are numerous inquiries, but the doubts surrounding all bonds of unfinished roads, and the paucity of *cash* resources with nearly all, form a fatal barrier to successful negotiation. For *steel* the inquiries are fitful but the prospects good. The Canadian government have lately contracted for 30,000 tons for 1875 delivery, at about $54 gold, delivered at Montreal. In this market the import of English-made Bessemer rails has nearly ceased, the present duty of $25.20 per ton being practically prohibitory.

"*Old Rails.*—Very little has been done during the past month and our quotations are nominal."

British Rail Exports.

The Board of Trade returns show that the total exports of railroad iron from Great Britain in October were 67,542 tons in 1874 against 74,873 in 1873; and for the ten months ending in October they were 705,537 tons in 1874 and 666,469 in 1873. The exports to the United States were, for October, 6,172 tons this year against 8,064 in 1873, and 91,626 tons for the ten months against 160,036 in 1873. In the total exports there has been an increase of 6 per cent.; in the exports to the United States a decrease of 43 per cent.

Aluminum for Engineering Instruments.

Mr. S. B. Clevenger recommends in *Van Nostrand's Magazine* the use of aluminum as the metal of engineer's instruments, its great recommendation being that an equal bulk weighs but one-fifth as much as brass, an ordinary transit weighing eleven pounds in brass weighing but three pounds in aluminum, and within the limits of practicable weight such instruments could be made very much larger and more accurate than in any other metal. Aluminum costs about half as much per pound as silver, does not rust or tarnish so easily as brass. Mr. Clevenger says: "It combines the ductility and malleability of copper with vastly more than the strength of steel (it is placed by some as 13 times stronger) with the lightness of chalk."

OLD AND NEW ROADS.

Tubular Transit Company of Staten Island.

A meeting was held in New York recently to arrange for completing the organization of this company. The proposed route of the road is from the New Jersey Central near Bergen Point, passing under the Kill von Kull by a tunnel to Tompkinsville on Staten Island, thence along the north shore of the island to a point opposite Elizabethport, whence one branch of the line will pass under Staten Island Sound by a tunnel and then to a junction with the Pennsylvania near Elizabeth The other branch will continue along the shore to Tottenville, and then cross by another tunnel to Perth Amboy, connecting with the Easton & Amboy. The company purposes also to establish extensive docks and a coal depot on Staten Island.

Chicago & Pacific.

Mr. Warren Colburn, the commissioner appointed by the Court in the matter of the grade crossing over the Chicago & Nortwestern at Elgin, Ill., has made his report. He describes the place chosen for the crossing, which is 4.2 miles from Elgin and at a point where the Northwestern passes through a cut 20 feet deep, making a grade crossing peculiarly dangerous. A better place could have been found about half a mile distant. He makes a careful calculation of the expense caused by the grade crossing and arrives at the following conclusions:

1. Extraordinary danger would arise from a grade crossing at the point chosen, which, however, could be avoided by a change in location at a cost of about $5,000.
2. A grade crossing would damage the Northwestern about $16,000 and the Pacific $2,000 per year.
3. A loss will be caused by detention of traffic and probable accidents.
4. The Chicago & Pacific track can be raised enough to pass over the Northwestern, but the track of the latter cannot be lowered more than two feet.
5. The cost to the Chicago & Pacific of an elevated crossing would be $28,234, or $19,250 in excess of the present line, and as the present line will probably be laid for temporary use, the total excess will be about $39,092.

The Court has made no order, a suggestion being made that the Chicago & Pacific might run for a short distance on the Northwestern track, thus avoiding stoppages. Testimony on this point was ordered to be taken. If allowed, however, this will be only a temporary expedient, and an elevated crossing will most probably be ordered for permanent use.

The Court subsequently made such an order allowing the Chicago & Pacific to enter and run on the Northwestern track a short distance, the details to be arranged by the engineers of the two companies and each company to keep watchmen at the points of intersection. This arrangement is to continue until April 1, 1875, unless otherwise ordered by the Court.

Erie.

In London, December 2, Mr. McKenna, a stockholder, obtained an injunction in Chancery restraining the company or its agents from applying money raised by hypothecating boads of the second consolidated mortgage loan toward paying the December coupons. The case was to come up again December 11. The Court subsequently dissolved the injunction.

In the Angell suit in the New York Supreme Court, Judge Westbrook has appointed John L. Lawrence Referee to take testimony as to the facts upon which the temporary injunction is based.

Another somewhat similar suit has been brought by the executors of John Arnot as holders of 250 shares of Buffalo, New York & Erie stock. They ask for the appointment of a receiver to hold the 5 000 shares belonging to the Erie, and for an injunction to restrain the Erie from voting on that stock. An order to show cause was granted. The complaint alleges that the Erie management has violated the lease of the Buffalo, New York & Erie road and is seeking to place a mortgage for $10,000,000 on that road to the injury of the stockholders.

The injunction in the Arnott suit has been so modified as to permit the payment of interest on 202 of the new Buffalo, New York & Erie bonds which have been issued in exchange for old bonds and to allow the payment of old bonds which have become due in any manner except by exchange for the new bonds.

Chesapeake & Ohio.

A number of the employes in the shops at Huntington, W. Va., struck December 1, and refused to allow any trains to leave except an engine and one car with the mails. The strike is for back wages, three or four months' pay being due.

The delay of trains lasted only 24 hours. The strikers were paid off and discharged, and there has been no further trouble.

The stockholders met in Richmond, December 3, and adjourned until December 23, without electing directors, the President's annual report not being ready.

The Richmond *Enquirer* of December 2 says: "The Chesapeake & Ohio Railroad Company are now prepared to offer reduced rates to shippers over this line. A tariff has been made reducing the rates 50 per cent. to points on the Ohio River and west of Kanawha Falls, and under the tariff of the Baltimore & Ohio Railroad. By this means it is expected to command a trade that has hitherto gone to Baltimore and Cincinnati. The company has also affected an arrangement with the Baltimore & Ohio road by which they can give through rates to one station on the Valley Railroad and the main line.

Richmond & Petersburg.

At the annual meeting in Richmond, Va., last week, a resolution authorizing the issue of a new mortgage to consolidate the debt of the company, limiting the total funds and liabilities to $400,000, was adopted by the stockholders.

Buenaventura & Cauca Valley.

English journals of the 21st of November have advertisements asking for subscriptions to a loan of £600,000 of 7 per cent. first mortgage bonds of this company, the interest on which is guaranteed by the United States of Colombia, secured by hypothecation of its customs revenues. The subscription price is 75 per cent. of the face of the bonds. This company, we believe, first had its headquarters at Peoria, Ill., where several railroad men and others had an interest in it; but was reorganized at New York. The advertisement says that considerable progress has been made on the first 25 miles of the line, which is to begin at the port of Buenaventura, on the Pacific, eastward over the mountains to the west side of the river Cauca, which has its outlet in the Carribean Sea. Mr. Charles Douglas Fox, of the London firm of Sir Charles Fox & Sons, is the engineer of the railroad. A contract has been made for its completion within three years. A mule road over the mountain, which is said to have cost the government $1,000,000 is transferred to the company. The popula-

tion to be served is chiefly in the Cauca valley, which has now a river outlet to the Atlantic coast through the Republic of Ecuador, which, apparently, must be cheaper than railroad carriage over the Andes can possibly be.

A correspondent of one of the journals in which this advertisement appears calls attention to the fact that the United States of Colombia has not paid the interest on its bonds issued in 1868 since July 1, 1872, nor redeemed the proportion of them which it promised to do, so that its guarantee will not be likely to have much value.

The Campaign for Government Subsidies.

A Washington correspondent of the New York *Times* says:

"A powerful combination exists in the lobby, according to report, in the union of the interests of the Northern Pacific, Southern Pacific, Atlantic & Pacific Railroads, and the cotton tax refund. There are many elements for combination among these enterprises. The cotton tax people are all desirous of having the Southern Pacific Railroad completed, because they think it would aid the rapid development of a portion of the South, particularly the State of Texas. The railroad, for the sake of securing the guaranty of its bonds, will assist the refund of the cotton tax. The Atlantic & Pacific Railroad is more anxious to secure a subsidy of land in the Indian Territory than to secure an extension of its line beyond the Indian country. To secure this the company is willing to unite with the Southern Pacific at Santa Fe for one line west from that point to the Pacific coast. The Northern Pacific has nothing to concede, and no interests in common with other parties, but will simply exchange its influence in Congress, placing its legislative capital in the common fund. There has not been for many years really so much chance for the success of these schemes as this winter, and the fight against them must be constant and unsparing, or they threaten to prevail."

Valley, of Ohio.

This company gives notice that all its scrip will be paid on presentation at the office in Cleveland, O., and interest on the scrip will cease after December 7. All subscribers to the capital stock any part of whose subscriptions are yet unpaid, are notified that interest will hereafter be charged on the unpaid assessments from the time they become due, and if such assessments are not paid by December 15, legal proceedings will at once be resorted to to enforce payment.

Western Maryland.

The Baltimore & Western Maryland Company, which made a proposition to the City Council of Baltimore a month ago offering to buy this road on certain conditions and to extend it to Johnstown, Pa., and otherwise improve it, has withdrawn its proposition. The reason assigned is that it had not been received by the public or the city authorities with the favor that had been anticipated. This action ends the matter for the present.

New York Elevated Railroad.

The bill authorizing the extension of this road to the Central Park has been vetoed by the Governor of New York. In so doing the Governor calls attention to the fact that the rights of the company are contested by the West Side Elevated Railroad Company, and while those rights are in dispute and in course of judicial investigation he deems it unjust for the Legislature to pass such an act. He makes, besides, other objections.

Illinois Central.

The Land Department reports for November sales of 5,504.44 acres of land for $37,783.47. Cash collections for the month were $34,997.09.

The Traffic Department reports November earnings as follows:

	1874.	1873.
In Illinois, 707 miles	$490,093.50	$484,207.32
In Iowa, 402 miles	152,144.50	151,832.15
Total, 1,109 miles	$642,238.00	$636,039.47

This shows an increase of 1¼ per cent. in the Illinois earnings, of 0.1-5 per cent. in the Iowa earnings and of 0.15-16 per cent. in the total earnings.

Connecticut Central.

The location of this road from East Hartford, Conn., north to the Massachusetts line has been submitted to the Railroad Commissioners. The contractors are ready, and as soon as the location is approved work will be begun at Broad Brook.

Petersburg.

In a suit brought against this company in a Maryland court certain cars belonging to the company were attached while in Maryland, and on the Baltimore & Potomac road. The company seeks to have them released because they are covered by mortgage and because it claims that the cars could not lawfully be attached under the circumstances. The case is of much interest as determining whether cars running on through lines can be attached when away from their own roads.

California Pacific.

In the bankruptcy suit begun by the bondholders the company has put in an objection to the jurisdiction of the Court, and also to the constitutionality of the law under which suit is brought. It is also alleges that it is the California Pacific Extension Company and not the California Pacific which is indebted to the complainants, and that the suit should be brought against that company.

Mobile & Alabama Grand Trunk.

Arrangements have been made to return to the State of Alabama all the bonds bearing its indorsement, under the provisions of the law of 1873, which will entitle the company to $4,000 per mile in State bonds. Agreements have, it is said, been made which will secure the immediate extension of the road from the present terminus on the Tombigbee River north about 70 miles to the crossing of the Alabama Central road.

New York & Oswego Midland.

Mr. Hewitt, the Receiver, has written a letter, to correct some erroneous impressions which, he says, are current in the community with respect to the road. During the first year of his receivership the road was run, he says, at a loss amounting in the aggregate to over $300,000. Of this sum, however, over $100,000 was expended for construction purposes, and the result is that the road is now in much better order than when it came into the hands of the Receivers. It is now no longer run at a loss; on the contrary, the earnings are equal to the expenses, and were it not for the floating debt accumulated during the past year, there would be no trouble in keeping it permanently available for public use. There would be little trouble, however, in carrying this until it can be paid from earnings or until the road is sold, but the Receivers are threatened by another difficulty. This is the taxes assessed upon the road under the act of the last Legislature authorizing its taxation. The amount is about $100,000, and there are absolutely no means to pay it, and if attempts are made to collect it the Receivers will be compelled to close the road.

The Utica *Herald* says, in commenting on this letter:

"In this connection, it is not improper that we should state that a conviction has arisen in the minds of many interested in the Midland, that the Receivers are running it in the interest of speculators, with a view of depleting it so completely that it will fall an easy prey to them upon foreclosure sale. This suspicion may do great injustice to the Receivers. It is chiefly based, we believe, upon their management of the trains. They leave the termini at unseasonable hours, upon time-tables apparantly arranged to incommode and drive away passenger traffic. Until lately no passenger coaches at all were run over the main line. Disgusted patrons were crowded into filthy cabooses, and the time-tables gave no clue as to the time when one might reach his destination. The protest of the people has lately induced the Receivers to restore the passenger coaches. But other indications of mismanagement remain as conspicuous as ever.

"We are informed that there is no reason to expect the foreclosure and sale of the railroad earlier than next July. The efforts of the first-mortgage bondholders to agree upon a plan of reorganization have thus far resulted only in new difficulties and complications, to which there is no visible end. The earlier steps toward reorganization were neutralized through the maneuvers of the speculators who hold the junior securities of the road. To secure their rights as against these speculators, the first-mortgage bondholders may be obliged to resort to the law. New troubles seem to beset the Midland, and all concerned with it, at every step."

Portland Railroad Matters.

The committee of the Portland (Me.) City Council to which the matter was referred has made a report recommending the purchase of Galt's Wharf at a cost of $80,000 and its improvement at a further cost of $50,000, for the use of the Grand Trunk road and the ocean steamers. The Grand Trunk agrees to build an elevator and sheds and to make Portland the distributing point for Maine and eastern New England.

A Daring Train Robbery.

About 3 o'clock on the afternoon of the 8th, when the eastbound express on the Kansas Pacific was near Muncie, Kan., eight miles west of Kansas City, it was signalled to stop. On stopping five armed men took possession of the engine and express car, ran them some distance ahead, and robbed the express safe of about $32,000. The party then rode off. Rewards amounting in all to $17,500 have been offered for the capture of the robbers.

Northern Central.

At the adjourned meeting in Baltimore, December 8, to receive the report of the Committee appointed last Spring to negotiate for a lease to the Pennsylvania Railroad Company, two long reports were presented, neither signed by a majority of the committee. After a long discussion both reports were laid over to the regular annual meeting in February next.

Kent County.

The road has been leased to Mr. J. M. Hood, formerly Superintendent of the Queen Anne's & Kent, who contracts to operate it until the sale. As soon as the lease can be prepared the running of trains will be resumed.

Logansport, Crawfordsville & Southwestern.

This company is laying down a connection with the track of the Detroit, Eel River & Illinois road at Logansport, Ind. As soon as the track is completed trains will be run through from Toledo to Terre Haute and possibly to St. Louis by this route.

New York Central & Hudson River.

The new tracks from Albany to Syracuse are now in full use. Passenger trains use the two south and freight trains the two north tracks, giving one old and one new track to each class of trains.

The working time in all the shops is now eight hours daily, this reduction in time being in addition to the reduction in force made recently.

Hudson Tunnel Railroad.

The company has commenced legal proceedings to condemn the land on which the shaft for the east end of the proposed tunnel is being sunk, at Hoboken. The land belongs to the Delaware, Lackawanna & Western Company.

Springfield & Northwestern.

This road was formally opened through to Springfield December 8, and regular trains are now running from Springfield, Ill., to Petersburg.

North Wisconsin.

The completion of the first section of 40 miles of this road was celebrated November 28 by an excursion over the line, a number of invited guests being present. The terminus is literally in the woods, there being only a single house near it.

New Orleans, Mobile & Texas.

The foreclosure sale of the line west of the Mississippi was made subject to a bill in equity now pending in the United States Circuit Court in which Mr. Charles Morgan is plaintiff, and to a judgment in favor of the State of Louisiana for $700,000 guaranteed bonds.

Pennsylvania—New York Division.

Work has begun on the new bridge over the Delaware at Trenton, which is to replace the present structure.

Baltimore & Ohio.

The order permitting the Chicago Division to cross the Michigan Central at grade at Lake, Ind., was, it appears, only intended to be temporary. Judge Drummond of the United States Circuit Court has appointed a commissioner to examine the crossing and to report if it is practicable to substitute one above or below grade and also the probable expense of the changes in one or both roads required to make such a crossing.

Pullman cars now run through regularly between Baltimore and Chicago.

The transfer of the East Alexandria Branch from the Washington City & Point Lookout Company has been completed. The branch extends from Hyattsville, Md., to Marbury Point opposite Alexandria and is 12½ miles long. The consideration paid was $20,000, and the Baltimore & Ohio assumes an issue of $500,000 bonds, which it had already guaranteed.

Pennsylvania.

A meeting was held in Philadelphia, December 2, of a committee of citizens opposed to the erection of the proposed stock-yards and slaughter-houses of this company on the west bank of the Schuylkill, above Market street, in West Philadelphia. A letter was received from President Scott stating that the site had long been selected and that he had been instructed by the board of directors to say that contracts had been made for the erection of stock-yards. The company did not believe that they would be prejudicial to public health and would therefore proceed with the work.

The committee resolved to employ counsel to act at once and test the right of the company to use the site chosen for purposes at variance with the convenience and health of the public.

The work of grading and preparing the ground has been begun, and a considerable force is employed on it.

Valley of Virginia.

Mr. C. A. Davidson, the Rockbridge County director in this company, has a made a statement of its affairs to the Lexington (Va.) *Gazette*. He says that the cash subscriptions to the stock were $2,095,000, bond subscriptions $1,105,000, making $3,200,000 in all. The city of Baltimore and the Baltimore & Ohio Railroad Company have each paid into the treasury of of the Valley Railroad Company the sum of $1,000,000 cash; the County of Rockbridge has paid $315,000 in bonds; the county of of Botetourt has paid $60,000 in bonds; the city of Staunton has paid $75,000 in bonds, and the town of Lexington has paid $18,000 in bonds.

The money has been expended as follows: The road from Staunton to Harrisburg cost $1,343,851.25; work to the amount of about $907,000 has been done between Staunton and Salem; between $100,000 and $200,000 have been expended for the right of way between Staunton and Salem, and a large amount for engineering and other expenses.

In order to pay these expenditures, the whole of the $2,000,000 in cash, $126,000 of Rockbridge bonds, $60,000 of Botecourt bonds, and $75,000 of Staunton bonds have been used.

The company still owes the contractors about the sum of $350,000 for work done in October and November, and for reservation.

The company still has in its treasury $189,000 in Rockbridge bonds and $18,000 in Lexington bonds; and has subscriptions in bonds from the counties, etc., still unpaid to the amount of $637,000.

In view of the fact that the cash subscriptions were exhausted, and that the present was not a favorable time to negotiate the mortgage, the Board of Directors deemed it best to give notice for the suspension of the work by December, with the hope of being able to resume in the Spring.

New Jersey & New York.

The track is laid to Haverstraw, N. Y., 16 miles north of the old terminus at Spring Valley. The road is being finished up, and will be ready for use in a short time. The new equipment is nearly completed, some of it having been already delivered.

Central Pacific.

Mark Hopkins and S. W. Sanderson, trustees under the land mortgage, advertise that they hold $500,000 in gold coin, with which, in accordance with the terms of the mortgage, they propose to redeem such bonds as shall be offered at the lowest price, provided the same is at or below par. They will receive sealed proposals for the surrender of bonds at their office, corner Townsend and Fourth street, San Francisco, Cal., until December 15.

Meetings.

The following companies will hold their annual meetings at the times and places given:

Chesapeake & Ohio (adjourned from December 3), at Richmond, Va., December 23.

Long Branch & Sea Shore, at Long Branch, N. J., January 6.

Baltimore, Hampden & Towsontown, in Baltimore, December 16.

Dividends.

Dividends have been declared by the following companies:

Consolidation Coal Company (which owns the Cumberland & Pennsylvania Railroad), 4 per cent., semi-annual, payable January 2.

New York, New Haven & Hartford, 5 per cent., semi-annual, payable January 1.

New York Central & Hudson River, 2 per cent., quarterly, payable January 15.

New York & Harlem (New York Central & Hudson River lessee), 4 per cent., semi-annual, payable January 2.

Pittsburgh, Washington & Baltimore.

At the annual meeting in Pittsburgh no report was presented, owing to the shortness of the time since the close of the fiscal year. The stockholders voted to change the year so that it should end September 30 instead of October 31, and adjourned to meet February 3.

West Pennsylvania.

The Court having refused to grant the Columbia Conduit Company an injunction to prevent violent interference with its pipe line where it passed under the West Pennsylvania track, the pipe was torn up, December 4, by a large force of Pennsylvania employes, who have since held possession of the ground.

The refusal of the injunction was based on alleged informalities in the charter of the Conduit Company. There is no pretense that the pipe interfered in any way with the track of the railroad.

Indianapolis, Bloomington & Western.

A meeting of stockholders was to be held in Indianapolis December 9, to consider the condition of the company.

The second-mortgage bondholders' committee requests bondholders to forward powers of attorney to foreclose the mortgage to the committee before January 2.

Illinois Midland.

The agreement for the consolidation of the Paris & Decatur, Paris & Terre Haute and Peoria, Atlanta & Decatur roads having been approved by the stockholders of all the companies, deeds have been recorded in all the counties through which the road passes. The name of the consolidated companies is the Illinois Midland.

Bucksport & Bangor.

The track is laid to Bangor, Me., 19 miles from the southern terminus at Bucksport. The bridge over the Penobscot has been completed and connection made with the European and North American road.

Fort Scott & Southeastern.

An officer of the company informs us that during November 7½ miles of track were laid on this road from Fort Scott, Kan., southeastward.

Erie Canal.

The canal was closed for navigation by order of the Commissioners, December 5. For the first time in a number of years it remained open until the day fixed, the ice having usually anticipated the time appointed by the board.

Mount Sterling.

Arrangements have been made with a committee from Cynthiana, Ky., for the commencement of work on this road and for its extension to Cynthiana. It is now agreed that the road is to be pushed through to the coal mines, 20 miles south of Mount Sterling, at once, after which the line from Mount Sterling northwest to Cynthiana, 32 miles, will be built.

Keokuk & Mount Pleasant.

It is proposed to build a narrow-gauge road from Keokuk, Ia., north to Mount Pleasant, a distance of about 45 miles. The projectors intend to buy the iron and equipment now in use by the contractors on the Des Moines Rapids improvement which will be sufficient for some 10 miles of road.

Kankakee & Valparaiso.

There is talk of building a road from Kankakee, Ill., northeast to the Fort Wayne road at Valparaiso, Ind. Subsidies are said to have been promised.

Western Railroad Bureau.

At the meeting of the commissioners held in Cincinnati, December 2, it was decided that mileage on east-bound freights between common points should be calculated by the shortest routes, and the rates should be made accordingly.

A meeting of managers was held in Chicago, December 2, to ratify the agreement abolishing free passes and secure the cooperation of the lines west and south from St. Louis. It was unanimously resolved that after January 1, 1875, the whole system of issuing free passes be abolished and that no one be allowed to ride free except officers, agents and employes traveling on their own roads and on the business of the company. To constitute an employe entitled to free passage the person concerned must be in the receipt of a regular salary from the

company. Passes outstanding may remain in use till December 31, if they do not expire sooner, but no new ones shall be issued and none renewed. The agreement shall not cover cases where a company is bound to issue passes by any virtue of existing leases or other written contracts. The companies signing the agreement are the Chicago, Burlington & Quincy, Illinois Central, Chicago & Northwestern, Winona & St. Peter, Chicago, Milwaukee & St. Paul, Chicago, Rock Island & Pacific, Chicago & Iowa, Chicago & Paducah, Chicago, Pekin & Southwestern, Gilman, Clinton & Springfield, Chicago & Alton, Chicago, Danville & Vincennes, Western Union, Missouri, Kansas & Texas, Hannibal & St. Joseph, St. Louis, Kansas City & Northern, Atlantic & Pacific, Kansas City, St. Joseph & Council Bluffs, Kansas Pacific, Leavenworth, Lawrence & Galveston, Missouri River, Fort Scott & Gulf, Central Branch and St. Louis, Iron Mountain & Southern, twenty-three in all.

A meeting of General Freight Agents was held at the same time, and it was agreed that arbitrary rates should hereafter be imposed on all through freights from St. Louis and Chicago to points west. It was also agreed that no company should contract for freight after January 1, below the rates agreed upon in June last.

Damages to Shipping from Railroad Bridges.

In a suit for damages for injuries received by a steamboat in a collision with a railroad bridge, the United States Supreme Court has recently decided that boats passing such bridges did so at their own risk; that owners, masters and pilots of steamers must accommodate themselves to the exigencies of commerce; that railroad bridges over navigable waters are necessities, and that steamboats must use all reasonable precautions against injuries in passing them. The decision is of much importance as establishing a precedent. Steamboat people have heretofore held the theory that railroad bridges over navigable waters are obstructions and that boats are entitled to damages for injury received under almost any circumstances.

Davenport & St. Paul.

The bondholders, claim that the judgment for nearly $90,000 recently obtained by the contractors, Burch, Lakin & Co., in Fayette County, Ia., was obtained without knowledge of the trustees. They have therefore begun proceedings to set aside the judgment and also another obtained in October. The Scott County Circuit, in which the suit was begun, granted a temporary injunction to prevent the sheriff's sale of that portion of the road which lies in Fayette County, which was to have taken place December 3. It is reported that the bondholders are about to begin other suits against the company and also the Davenport Construction Company, which built the road.

Application is also made to set aside a judgment obtained by contractors in February last, under which the road in Delaware County was sold May 4. The trustees allege that they were served with notice as parties to this suit May 22, three months after judgment was given and 18 days after the sale. The bondholders desire to have this case re-tried as well as the others.

Little Rock & Fort Smith.

At the Boston bondholders' meeting it was stated that the question was, whether the bondholders would advance money enough to wipe out the debt, form a new company, and complete the remaining 20 miles of road by May 1, next, or take their chances of getting a share of the proceeds of the sale. After much discussion, Messrs. Huntington, Hildreth and Gookin were appointed a committee, with power to send out agents to bid for the road at the sale, and also to fix a limit of time when outsiders can come in. The sale was to take place December 10.

Vicksburg & Canton.

The report that this company had been put in the hands of a receiver is contradicted by the President in the following dispatch, sent to parties in Chicago who are interested in the road: "There are no suits or litigations against the Vicksburg & Canton Railroad. Everything stands as it did when you left. It is not in the hands of a receiver."

The Hoosac Tunnel Line.

The Governor and Council of Massachusetts have just completed an inspection of the tunnel. Steel rails have been laid from North Adams nearly to the Western portal of the tunnel, but it is thought inexpedient to continue the work through the tunnel at present. Matters are so far advanced that freight trains might be run through in a few weeks, but there is continued trouble from falling rocks, and the tunnel can hardly be pronounced safe until some 5,000 feet of arching is completed. It is proposed to lay a temporary track with iron rails for present use.

Willamette Valley & Coast.

This company has been organized to build a narrow gauge road from Corvallis, in Benton County, Oregon, nearly due east to the coast at Yaquima Bay, a distance of about 40 miles. The estimated cost is $500,000.

Springfield & Illinois Southeastern.

The court has refused to grant the mandamus asked for to compel the County Commissioners of Cass County, Ill., to issue $50,000 county bonds in payment of a subscription voted in aid of the road. The issue of the bonds was refused on account of alleged informality in the election at which they were voted. An appeal is to be taken to the Supreme Court.

Flint & Pere Marquette.

The last rail on the extension from Reed City to Ludington was laid November 30. The road will be finished up and trains will begin running in a few days. The main line owned by the company now extends from Monroe, Mich., a little west of north to East Saginaw, and thence a little north of west to Lake Michigan at Ludington, a distance of 255 miles. The company owns also 29 miles of branches, making 284 miles in all.

Delaware & Hudson Canal.

Navigation on this canal has been formally closed, the last boats reaching tide-water November 30. The coal shipments through the canal from Honesdale for the season were 1,315,682 tons, a decrease from 1873 of 42,371 tons, or 3.12 per cent. There is now stored on the docks at Honesdale 40,844 tons, against 224,931 tons at the close of navigation last year. About 230,000 tons have been shipped over the Erie road since January 1.

Toledo, Peoria & Warsaw.

In the United States Circuit Court at Chicago the motion for the appointment of a receiver has been set over to December 20, to give the parties concerned time to agree upon a suitable person for the office. If no agreement is possible the court will make an appointment within ten days thereafter.

Rutland & Woodstock.

A preliminary survey is being made for a railroad from Rutland, Vt., east to Woodstock, a distance of about 25 miles.

Pacific Mail.

Rumors are current of mismanagement of the affairs of this company and of heavy losses resulting from its operations. The President, Russell Sage, has resigned, it is intimated on account of the bad condition of affairs. It is charged that the true condition of the company has been carefully concealed from the stockholders and that the management has been conducted with reference mainly to the stock operations of certain of the officers. It seems probable that the company is in trouble, and it is difficult for outsiders to ascertain anything about its true condition. It is certain, also, that there are serious dissensions in the board of directors.

Warwick.

This road has been completed and was opened for business December 3, on which day an excursion train passed over the line. The road runs from a point on the New York, Providence & Boston, five miles south of Providence, southeast to Warwick Neck on Coweset Bay, and is about five miles long. The road is expected to have a large pleasure travel in summer and a coal depot is to be established on the bay, from which a considerable traffic is expected. It is to be worked by the New York, Providence & Boston Company.

Junction & Breakwater.

Heretofore the steamer line from Lewes, Del., to New York has been run only in summer. This year, however, the Old Dominion Steamship Company, which now controls the road, has resolved to continue to run the line all winter, and the business of the road has been much improved thereby.

Paris & Danville.

Work is progressing on the extension southward, and track is to be laid to the Ohio & Mississippi at Lawrenceville early next year. The general offices are to be removed from Paris, Ill., to Danville, as soon as the extension is completed.

Burlington & New York.

There is talk of building a railroad from Burlington, Vt., southward along the shore of Lake Champlain to the nearest point where the lake can be bridged and a connection made with the New York & Canada road. The northern end would be parallel and very close to the Rutland road.

Frankford & Breakwater.

Regular trains began running over this road November 30. It is about 16 miles long, from the Junction & Breakwater road at Georgetown, Del., south to Frankford. It will be worked in connection with the Junction & Breakwater road, of which it is really a branch.

There is said to be no immediate prospect of the completion of the extension from Frankford south to the Wicomico & Pocomoke road near Berlin, which was partly graded last Summer.

Central, of New Jersey.

The permanent line of the Newark & New York Branch through Bergen Hill is so far finished that one track is being laid through it and will be ready for use in a few days. For most of its length the cutting is of full width, but there are two places, one at Bergen Avenue Station and the other between that place and Lafayette, where the rock-cutting is only wide enough for a single track. These cannot be completed until after the removal of the temporary track now in use which at those points runs close upon the bank of the cutting.

A year ago the company leased a large tract of land with water front at New Haven, Conn., and it is said that improvements of this tract are to be begun shortly. The New Haven *Union* says: "The main structure which is to be built is an enormous stone wharf, which is to run parallel with the carriage road, and which will be in length 1,000 feet, in width from 80 to 100 feet." On the top of this wharf will be erected enormous coal pockets, capable of containing a number of thousand tons of coal. A large elevator will also be built. The cost of the operation will be something immense. The mud, as shown by piles recently driven, is from 30 to 40 feet deep. This will necessitate considerable dredging and piling. It is also part of the plan to dredge out the channel so that laden vessels may come in to the wharf to discharge cargoes. The coal dealers will be affected by the project, as the business operations of the company are to be carried on in a style not inferior to their building scheme. The plans have been advanced sufficiently to satisfy the company that the idea is feasible, and work will begin in about a fortnight."

Boston Tide Water Connections.

The Springfield, (Mass.) *Republican* says:—"The legislative committee appointed on the petition of Edward Atkinson and others to consider the difficulties of the railroad termini at Boston have taken much testimony, and what is generally of more value, have given the subject much personal investigation. They have sufficiently matured their views to decide on the basis of their report. They will recommend a junction railroad sweeping around Boston from Waltham on the Fitchburg road through Newton, Brookline and Jamaica Plain, piercing South Boston Hights by a tunnel half a mile long and coming out upon the flats at tidewater and in such a location that connection can be made with the Lowell and Eastern railroads on the harbor side of the city, by laying tracks along some of the new avenues projected and building along the wharf line. In this way it is claimed that the freight business of the Fitchburg, Massachusetts Central, the Providence and southern roads and the domestic freight of the Boston & Albany can be debouched in one yard, close to the docks, while freight destined to city consumption can be delivered at a point on some of the avenues within a mile of the post-office. The plan avoids vexatious grade-crossings and heavy land damages, and resembles in general the one proposed by Mr. Atkinson, though varying considerably in detail. The road will be 15 miles long, and steps are already being taken to form a corporation to undertake its construction.

"The importance of an economical solution of the terminal difficulties is realized more than ever, now that New York is in danger of being crippled by her expensive port accommodations. To transport a bushel of grain a dock's length by wheelbarrow, or by dray, with the concomitant handling, may cost more than to transport it a hundred miles by rail when it is already laden. Yet, the Boston *Journal* says that, if the Hoosac Tunnel were ready to pass a car-load of grain tomorrow, it would have to be unloaded by the courtesy of the Boston & Albany road or transferred to the ship by wheelbarrows. The *Journal* makes this humiliating confession in order that it may disabuse the public of any idea that the tunnel drain on the State Treasury is at an end. On the contrary, 'several millions' more will yet be required. Perhaps the State will assume this responsibility, and perhaps the State won't. The *Journal* may well congratulate its readers that the Legislature didn't settle the tunnel question, in view of the delay in the completion of the bore. It has been a year of popular education in railroad matters, and, if we mistake not, the education all tends to convince people that a corporation is the safest and ablest power to manage a railroad, and at the same time not intractable to reasonable popular demands. Such a corporation must manage the tunnel, and, if it does, it must do its own borrowing and its own indorsing."

United States Claims Against Southern Railroads.

The annual report of the Quartermaster-General speaks as follows of the debts due the Government from the Southern roads, which are mainly for equipment and supplies sold to them at the close of the war:

At the close of the war there was sold on credit to various railroad companies, principally in the South, railroad material to the appraised value of $7,556,034. There remained due and unpaid from certain of these railroads, June 30, 1873, $4,658,924. During the fiscal year ending June 30, 1874, interest has accrued upon this indebtedness, and expenses have been incurred to the amount of $98,479. Payments in cash, in transportation, and postal earnings have been made to the amount of $116,791. On the 1st of July last there remained an indebtedness to be collected by the Quartermaster's Department of $1,897,397, not including the sum of $43,754 due from the Mississippi, Gainesville & Tuscaloosa Railroad Company, which is bankrupt, nor the amount due from the East Tennessee & Virginia, the East Tennessee & Georgia, the Nashville & Chattanooga, and the Nashville & Decatur railroads, which is $2,699,470, and which were compromised under the act of March 3, 1871, for the sum of $1,265,000, and made payable by the Assistant Treasurer at New York. The actual decrease of the debt during the year, including payments of accrued interest, but excluding the reduction by compromise under the law, is $28,311. The Alabama & Chattanooga Railroad settled its accounts during the year by payment in cash and by transportation and postal service to the amount of the balance due, $4,637. The Alexandria, Loudon & Hampshire, the Mobile & Ohio, and the Southwest Branch of the Pacific Railroad of Missouri, now part of the Atlantic & Pacific Railroad, reduced their indebtedness respectively $2,387, $31,603, and $14,182, in addition to paying on account of interest $5,559, making the total payments about $53,782. The debt of the Edgefield & Kentucky, the McMinnville & Manchester, Memphis, Clarksville & Louisville, Memphis & Little Rock, Nashville & Northwestern, and the Selma, Rome & Dalton Railroad companies has increased $83,263. The total collections on account of the sale of railroad material on credit to these Southern and Southwestern railroads, up to June 30 last, was $5,240,423. Thirty-four railroads have paid their debt, with interest and expenses in full. Sixteen yet remain in debt to the United States. Some provisions of law for the collection of the money due and settlement of the debt is desirable. Suits are in progress against several railroads on account of these sales.

The United States Engineer Corps.

The annual report of the Secretary of War gives the following summary of the operations of the Engineer Corps, as far as those operations concern railroad or water transportation questions:

"The report upon the practicability of bridging consistently with the interests of navigation, the channel between Lake Huron and Lake Erie, required by the third section of this act, was submitted during the last session of Congress, and printed, forming Executive Document No. 64, House of Representatives, Forty-third Congress, first session.

"An act approved June 22, 1874, provided for the appointment of a commission of engineers to investigate a permanent plan for the reclamation of the alluvial basin of the Mississippi River subject to inundation. The commission has been organized, and the members are now engaged upon the investigation and collection of the data necessary to the preparation of a full report.

"The surveys upon which to base estimates for the improvements recommended by the Senate Select Committee on Transportation Routes to the Seaboard, including that for the extension of the Chesapeake & Ohio Canal, are now in progress.

"The board of engineers provided for in the third section of the act has been organized, and the members are now engaged upon the investigations, examinations, and surveys necessary to the preparation of a report upon the best method of obtaining and maintaining a depth of water sufficient for commercial and military purposes, either by canal from the Mississippi River to the waters of the Gulf of Mexico, or by deepening one or more of the natural outlets of the river.

"The survey of the lakes has been carried on during the year with its accustomed energy and success. The connection of the triangulation of Lakes Superior and Michigan, the inshore and off-shore hydrography and topography have been finished; the Wisconsin triangulation has been carried southward to the vicinity of Chicago, and the Keweenaw base has been measured. The surveys of the Detroit River and River St. Lawrence, from the forty-fifth parallel, have been completed, and a map of the lower half of the former has been published; the determination of several points in the interior of Michigan has been made in aid of surveys by the State; the survey of Lake Ontario has been commenced, and much of the field work has been reduced. The preparation of Charts No. 1 of the St. Lawrence, of Sandusky Harbor, and of the mouth of the Detroit River has been completed, and they are now in the hands of the engravers. The need of the vigorous prosecution of this important survey is shown by the number of copies of the various finished charts called for now, from five to six thousand copies a year, and by the constant demand for charts not yet completed. It has been stated that a single survey made last year, viz: the survey of the mouth of the Detroit River will save from $50,000 to $100,000 to commerce this year."

The estimates submitted by the Chief of Engineers include an item of $12,970,500 as the amount recommended to be expended for the improvement of rivers and harbors for the ensuing year.

New Bedford.

The engine house of this road at New Bedford, Mass., was partly destroyed and four engines damaged by fire, December 6. The loss is estimated at $4,000.

Among the improvements made on this road during the past 18 months are the erection of one of the largest and best wharf depots in New England, at which the steamboats of the New Bedford & New York Company land. A large coal wharf has also been built in connection with the Philadelphia & Reading Coal & Iron Company at which 175,000 tons of coal have been received. The company has also made a considerable improvement in its train service, besides maintaining the previous good condition of the road and equipment.

Washington & Ohio.

The track is laid to Round Hill, Va., four miles beyond the recent terminus at Purcellville, and 51¼ miles west by north from Alexandria. Trains began running through December 7.

Bloomington & Indianapolis.

It is proposed to build a railroad from Bloomington, Ind. on the Louisville, New Albany & Chicago, northeast to Indianapolis, a distance of about 50 miles. Considerable local subsidies are said to be promised. There is also talk of extending the line from Bloomington south by west to Jasper, 60 miles, and making it an extension of the Cincinnati, Rockport & Southwestern.

Chicago, Dubuque & Minnesota.

Arrangements have been made to run the trains of this road across the Mississippi and into La Crosse, Wis., over the track and winter bridge of the Milwaukee & St. Paul.

West Wisconsin.

In the suit brought to compel the company to re-lay the track from Tomah, Wis., to Warren's Mills, which was taken up when the new line by Camp Douglass to Leroy was built, the Wisconsin Supreme Court has sustained the demurrer made to the company's answer, but grants leave to put in a new answer at the January term.

Palisade & Eureka.

Work has been resumed on this road and tracklaying is rapidly progressing. The rails are down to a point eight miles beyond the late terminus at Lodi, Nev., and 28 miles from Palisade.

Atchison, Topeka & Santa Fe.

In the New York Supreme Court, Henry W. De Puy has brought suit against this company, George Opdyke & Co. and a number of other defendants to recover $400,000 as his share of the profit of the contract for building the road. De Puy

was a stockholder of the association which built the road and claims that he never received his share of the profits. The defendants allege that he did not pay assessments and further that the contract was never carried out.

Harlan & Denison.

It is proposed to build a narrow-gauge road from Harlan, in Shelby County, Ia., northward to the Chicago & Northwestern at Denison, a distance of 26 miles. It is said that the line can be graded very cheaply.

Northern, of Canada.

Notice is given that an application will be made at the next session of the Dominion Parliament for an act to consolidate and re-arrange the capital account of this company.

ANNUAL REPORTS.

New York, New Haven & Hartford.

This company owns a main line from Williamsbridge, N. Y., to Springfield, Mass., 125 miles, with branches from Berlin, Conn., to New Britain, 2¼ miles; from Berlin to Middletown, 10 miles; from Windsor Locks, Conn., to Suffield, 3¼ miles, a total of 141 miles owned. It leases from the New York & Harlem the use of 11¼ miles of track from Williamsbridge to New York. It also works under lease the Shore Line road from New Haven, Conn., to New London, 50 miles, the earnings of which are stated separately. It also leases and works the Harlem River & Portchester road from New Rochelle to the Harlem River, 12 miles.

The property owned is represented as follows:

Stock ($109,993 per mile)	$15,500,000
Bonds ($7,525 per mile)	1,061,000
Total ($117,518 per mile)	$16,561,000

A summary of the operations for the year ending September 30 is as follows:

	1874.	1873.
Earnings from passengers	$2,877,380 50	$2 899,163 15
Freight	1,331 527 28	1,468,578 43
Other sources	193,167 19	333,493 92
Total earnings	$4,402,074 97	$4,701,235 55
Working expenses	2,406,03 1 46	2 641,016 33
Net earnings	$1,996,044 51	$2,060,219 22
Taxes	198,682 92	213,247 85
Interest	119,105 08	83,168 55
Hartford & New Haven bonds		37,000 00
	$317,788 00	$333,416 40
Surplus	$1,678,256 51	$1,726,802 82
Gross earnings per mile	$28,772	$34,342
Net " " "	13,046	14 611
Per cent. of expenses	54.66	56.18

The decrease in earnings was $299,160.58, or 6.36 per cent.; in expenses, $234,985.87, or 8.90 per cent.; in net earnings, $64,174.71, or 3.11 per cent.

The loss on working the Shore Line road was $5,733.49, and $110,000 was expended on permanent improvements on that line. The capital expenditure accounts for the New York, New Haven & Hartford road were increased $290,301.53 during the year.

Of steel rails 1,319¼ tons were bought during the year; $110,297.24 was expended on account of the new depot at New Haven. The company's lines are in thoroughly good condition and need no extra expenditure for the coming year.

Boston & Maine.

This company owns a line from Boston, Mass., to Portland, Me., 118¼ miles, with branches from Medford Junction to Medford, 2 miles, and from Rollinsford to Great Falls, N. H., 2½ miles. It works under lease the Newburyport Railroad, 26½ miles; the Danvers Railroad, 9¼ miles; the West Amesbury Branch, 4¼ miles, and the Dover & Winnepiseogee road, from Dover, N. H., to Alton Bay, 29 miles, 192¼ miles. It also owns the Methuen Branch, from Lawrence, Mass., to the New Hampshire line, 3¼ miles, which is leased to the Manchester & Lawrence Company.

The property owned is represented by the following securities:

Stock ($54,714 per mile)	$6,921.274 52
Bonds ($19,862 per mile)	2,512.500 00
Total (74,577 per mile)	$9,433.774 52

The interest charge on the funded debt is $175.875, or $1,392 per mile. The general account shows besides the usual current balances, an item of $901,509.08 bills payable. The profit and loss account amounts to $1,018,277.70, invested as follows:

Newburyport Railroad bonds	$303,993.00
Danvers " "	73,000.00
Danvers Railroad contract and stock	27,430.00
Dover & Winnipiseogee stock	263,144.48
The remainder in expenditures on improvement of road and equipment	350,710.22
Total	$1,018,277 70

The operations of the road for the year ending September 30 were as follows:

	1874.	1873.
Earnings from passengers	$1,410,530.85	$1,302.190.55
Freight	820,275.79	820,512.44
Mails and express	76,716.41	56,959.18
Rents	52,744.62	42.022.16
Interest and premium	61,531 60	78,409 35
Total earnings	$2,421,799.27	$2,30 ,093.68
Working expenses	1,459,769.25	1,533.359.34
Taxes	97,888.64	86,168.61
Total expenses	$1,557,657.89	$1,619,527.95
Net earnings	$864,141.38	$680,565.73
Interest	236,786.95	108,297.05
Balance	$627,354.43	$572,268.68
Gross earnings per mile	$12,614	$13,181
Net " " "	4,501	3,900
Per cent. of expenses	64.32	70.41

The year shows an increase of $121,705.59, or 5.29 per cent., in earnings; a decrease of $51,870.06, or 3.82 per cent., in expenses and taxes; an increase of $183,575.65, or 25.50 per cent., in net earnings.

The work of the year was as follows:

	1874.	1873.
Train mileage	1,424,698	1,458,963
Passengers carried	4,749,785	5,008,074
Passenger mileage	75,061,175	61,760,456
Tons of freight carried	559,922	542,004
Tonnage mileage	22,880,960	20,927,664

The increase in passenger mileage was 21.53 per cent., and in tonnage mileage 9.33 per cent.

The increase in taxes is due to the tax of 1¼ per cent. on capital invested imposed by the State of Maine on certain companies.

In May last connection was made with the Grand Trunk at Portland, and since the change of gauge of that road passenger cars have been run through from Boston to Lewiston and Auburn without change. A contract has been made for the use of the Grand Trunk passenger house in Portland.

The work of dredging on Mystic River at Boston has been completed. The pile belt east of Portland wharf has been rebuilt and the wharf itself much improved. During the year 16 miles of track have been relaid with new iron and 10¾ miles with steel, making 60¾ miles of steel rails now in use. The new passenger house at Dover and the round-house at Exeter have been completed. The wooden bridges on the line are gradually being replaced with iron.

One locomotive has been built to replace one broken up. Two passenger, 2 baggage and 6 freight cars have been added to the equipment, which now includes 69 engines, 122 passenger and 1,406 freight cars.

The contract for the use of the track from North Andover to North Lawrence by the trains of the Essex Branch road having expired, those trains are now hauled over that section of road by Boston & Maine engines. No agreement has been come to as to payment for such service, and the case has been referred to the Railroad Commissioners.

A contract was entered into in May last with the Eastern Railroad Company, which provides that all the business at competing points to and from other competing points, named and designated, shall be divided, after paying to the party doing the work a certain per cent. of the gross receipts. All competition, it was agreed, should cease from that date; and the reform of many other abuses, the natural offspring of competition, entered largely into the full and perfect consummation of the agreement. Since the first day of May last the business of the two roads between points of competition has been done with very little cause of complaint from either party. In the division of the business this road, as was anticipated, has been obliged to make monthly payments to the Eastern Railroad Company, varying in amount with the amount of business done.

Washington City, Virginia Midland & Great Southern.

This company owns or works a line from Alexandria, Va., south by west through Lynchburg to Danville, 237 miles, with a branch from Warrenton Junction to Warrenton, 9 miles, and a line from Manassas Junction west to Strasburg and thence south by west to Harrisonburg, 112 miles, with a branch to Front Royal, 1 mile, making 359 miles. Of the latter line 49 miles, from Strasburg Junction to Harrisonburg, is leased to the Baltimore & Ohio, making 310 miles worked. Of the main line 23 miles, from Gordonsville to Charlottesville, is leased from the Chesapeake & Ohio and used in common with that company. The road from Lynchburg to Danville, 66 miles, was opened for business May 1, 1874.

The company was formed by the consolidation of the Orange, Alexandria & Manassas and Lynchburg & Danville companies, the former being itself a consolidation of the Orange & Alexdria and Manassas Gap companies.

The following is a statement of the financial position of the company at the close of the fiscal year:

Orange & Alexandria bonds	$2,554.000
Past-due coupons funded in 1866	578,859
First-mortgage bonds, Orange, Alexandria & Manassas	1,649,000
Second-mortgage bonds, Orange, Alexandria & Manassas	25.000
Land bonds issued	106,700
Lynchburg & Danville bonds	526,500
Washington City, Virginia Midland & Great Southern bonds	1,035,500
Total funded debt ($19,272 per mile)	$6,475,559
Temporary debt ($5,018 per mile)	1,685,991
Total ($24,290 per mile)	$8,161,550

The two last named issues of bonds, $1,562,000 in all, are held by the Baltimore & Ohio Railroad Company.

The available assets of the company amount to $2,273,281.33.

In addition to the bonds of the first and third mortgages, which became due in May, 1873, those of the second mortgage will mature January 1, 1875. To meet this indebtedness at maturity, and to provide payment of all the mortgage bonds as these severally became due, the stockholders have heretofore, in accordance with an act of the Legislature of Virginia, authorized the issue of bonds to the extent of $8,000,000, bearing 7 per cent. interest, payable in gold 30 years from May 1, 1873, and secured by first-mortgage on its entire line of railroad and rolling stock and property generally. The mortgage under this authority has been duly executed and recorded, and the bonds prepared for issue and negotiation in accordance therewith.

Holders of mortgage bonds are allowed to exchange for these bonds at par, and the proposal has to a considerable extent been accepted. A wise discretion of creditors will obviate any temporary embarrassment of the road, and allow the completion of plans for permanent relief.

The operations of the company for the year ending September 30, were as follows:

	1874.	1873.
Earnings from passengers	$330,999 61	$406,933 24
Freight	478,821 25	459,470 58
Rental of Valley line	99,272 02	
Mails, express and telegraph	69,750 81	77,022 70
Total earnings	$978,843 69	$953,426 52
Operating expenses, including trackage charges	577,559 23	619,061 94
Net earnings	$401,284 46	$334.364 58
Gross earnings per mile	3,598 69	3,254 02
Net earnings per mile	1,475 31	1,141 18
Per cent. of expenses	59.00	64.93

The net earnings amounted to 6.2 per cent. on the funded debt.

The increase in gross earnings was 25,417.17, or 2.67 per cent.; the decrease in expenses was $41,502.71, or 6.70 per cent.; the increase in net earnings, $66,919.88, or 20.01 per cent.

The extension from Lynchburg to Danville is reported as doing a good business. A profitable traffic is expected from the extensive deposits of iron ore recently discovered along the line of the road.

The Cost of Transporting Freight to and from Boston.

The following committee report was submitted to the New England Association of Railroad Superintendents at its November meeting:

The committee on traffic, laws, rates and regulations, who were instructed to investigate and report what it costs per ton per mile to transport freight, and what it costs each of the eight railroads leading out of Boston per ton per mile for moving freight, based upon the report of the Railroad Commissioners for 1873, have attended to the duty assigned them, and ask leave to report that early in the investigation your committee were satisfied that there were no reliable data on which the exact cost of transporting a ton of freight one mile could be based. The construction and condition of one road differs so from another—no two being alike—that the cost of transporting freight over them must, of necessity, be as unlike and variable as their condition. One road is nearly straight and level, and another has sharp curves and heavy grades; and the cost of moving freight over them will be, all other things being equal, in the ratio of their grades and curves. It is estimated that, "taking the speed of freight trains at fifteen miles an hour, the resistance on a level is equal to 9.3 pounds per ton, and the total resistance due to a thirty-foot grade is equal to 22.4 pounds per ton." If this statement of the case be correct—and we have no reason to question its accuracy—then the cost of moving freight over a road with a thirty-foot grade is about 150 per cent., or as 9.3 is to 22.4, more than over a level track.

Another item which enters largely into the cost of hauling trains, more, perhaps, than is generally supposed, is the condition of the road-bed. If it is well ballasted; is level and in line, with good sleepers and perfect joints, trains are moved over it with but little friction and but slight wear and waste to the rolling stock, and with much less consumption of fuel than over a track which is poorly ballasted and is out of level and line, and with poor sleepers and low and battered joints. Another factor which enters into the account is the kind of freight to be moved. It costs more than twice as much per ton to handle light and bulky articles than such as are compact and heavy—more to load and unload furniture and stove-castings than oil in casks or manilla in bales. The value of the goods, their liability to be damaged are also items which go to make up the cost. The distance the goods are to be hauled determines whether the terminal charges are to be distributed, as the case may be, over thirty, fifty, a hundred or five hundred miles. Then we find that about sixty-three per cent. of the cost of operating a railroad are mixed charges; part belonging to passenger and part to freight traffic, and we are not aware of any rule or method by which the exact per cent. chargeable to each can be determined.

The farmer might as well undertake to decide what per cent. of the value of the golden corn that is ripening in his fields is due to the influence of the rain, the sun and the earth, as the managers of our railroads, under the present system of running trains and keeping accounts, with any degree of accuracy, what it costs per ton per mile for the transportation of freight. Railroad commissioners and others may fix an arbitrary rate, or may guess at the cost and assume that it is correct, but such estimate is not and cannot be based upon a demonstrable fact. The true cost will never be known until there is a railroad built and operated exclusively for freight. When such road is operated the exact average cost of moving a ton of freight one mile can be determined, and not until then.

Some people seem to think that railroad companies can and ought to carry freight and passengers at a nominal sum; that they are charitable institutions into which people put their money out of pure benevolence. Railroad managers endeavor so to arrange their rates of fare and of freights, that—with economy—in the aggregate, their net receipts shall be a fair and reasonable percentage on the capital invested. There is one thing which the public do not seem to understand, and which business men and boards of trade often lose sight of. If through freight, or raw materials used for manufacturing purposes, or season ticket or commutation ticket passengers are carried for less than cost—and it may sometimes, under strong competition, or for other causes, be good policy to carry freight and passengers at less than cost—the local freight, the regular ticket, or some other business must be charged enough in excess of its fair proportion to make up the loss. As a general rule, when it is found that a railroad is earning a fair dividend over its expenses, and an increase of business is offered, when some heavy freight or through business in large quantities can be obtained, the managers are not apt to calculate the exact cost of doing the increased business, or of charging its fair and just proportion of the cost of operating the road, but estimate only the cost of hauling, leaving out of the account a large number of items, such as repairs of road, repairs of buildings, taxes, insurance, damages and the salaries of its officers.

The enormous increase in the gross receipts on most railroads, in the last decade, and the slight increase in the net receipts—the net per cent. on the capital invested being about the same, indicate this, and should satisfy the public that the railroad companies are receiving only a fair compensation for the labor performed. We will illustrate by the Boston & Providence Railroad. In the year 1860 its gross receipts were $685,630.86 and its net receipts were $349,486.86. In the year 1873 its gross receipts were $1,822,108.18, and its net receipts $428,342.61; showing a gain on gross receipts of 165 per cent., and on net receipts only *twenty-two* per cent.

We now come to the second branch of the inquiry, "What did it cost each of the eight railroads leading out of Boston per ton per mile for moving freight, based upon the report of the Railroad Commissioners for 1873." Here, again, we are all afloat, without chart or compass. The report of the Railroad Commissioners, the accounts kept and the returns made by the railroad companies do not indicate the cost of hauling a ton of freight one mile, or give any reliable data from which it can be deduced. It is true the Commissioners make an estimate of the cost, but it is an arbitrary one, based on gross receipts, and not on actual cost. It might with equal propriety be based on the number of miles run, or by any other arbitrary method. Their estimate carries no weight because it lacks a true basis—it is not a mathematical fact. The only operating expenses reported by the Commissioners as charged *directly* to passenger traffic account are as follows: "Repairs of passenger, mail and baggage cars—new passenger, mail and baggage cars charged to operating expenses, passenger gratuities and damages, salaries, wages and incidentals of passenger department."

The operating expenses, reported as charged to the freight traffic, are as follows: "Repairs of freight cars—new freight cars charged to operating expenses, damages and gratuities, freight, salaries, wages and incidentals of freight department." Only about 37 per cent. of the operating expenses are charged to the accounts to which they belong. How shall we divide the 63 per cent.? What part of it belongs to the freight and what to the passenger traffic? The operating expenses which are undivided, and which belong in part to passenger and freight traffic in unknown proportions, are as follows: "Repairs of roads, exclusive of bridges and new rails; steel and iron rails, deducting old rails sold; repair of buildings and fixtures (stations); repair of and addition to machine shops and machinery; repair of fences, road-crossings and signs; local and State taxes and stamps, general salaries, office expenses and miscellaneous, not embraced in classes 3 and 4; insurance premiums and losses by fire, and damages for fire set by engines; repair of snow ploughs; new locomotives, charged to operating expenses; repair of locomotives; removing ice and snow; fuel, wood and coal; oil, waste, switchmen, flag and signalmen and telegraph operators." Take the outlays upon road-bed, sleepers, rails, spikes and switches. What proportion of them belongs to the freight traffic? On what basis shall the division be made? Your committee have given the subject much thought, but are unable to arrive at a satisfactory result.

In determining what per cent. of the deterioration of the track belongs to passenger and what to freight trains, the three elements of weight of train, of speed, and total miles run by each train must be taken into account, though in what precise ratio is not quite clear. Taking all things into consideration, we believe that the following statement of the case, made by a gentleman who is not a member of the committee, is not far from correct: "The most satisfactory and reliable division is effected by representing the effect of passenger and freight trains by the continued product of the *weight*, by the speed, by the mileage, in each case, respectively." In regard to the other items, no general formula of division can be fixed, as upon no two roads would the per cent. due to each be alike. In this state of the case your committee do not deem it important to try, or believe it possible, to fix on the exact cost of moving a ton of freight per mile on the eight roads leading out of Boston, from the data given in the report of the Railroad Commissioners for the year 1873.

All of which is respectfully submitted.

WARREN LADD,
C. L. HEYWOOD,
J. T. MCMANUS.